JAN 11 1944

PAPER TRADE JOURNAL

JANUARY 6, 1944

Established 1886

Prayer

May the New Year bring with it the full and complete defeat of our country's enemies. May it bring the return of our loved ones from all the fighting fronts of the world. May it see the establishment of a just and lasting peace so that men can live in harmony and contentment for generations to come.

A glorious and victorious New Year to all.

GOTTESMAN & COMPANY

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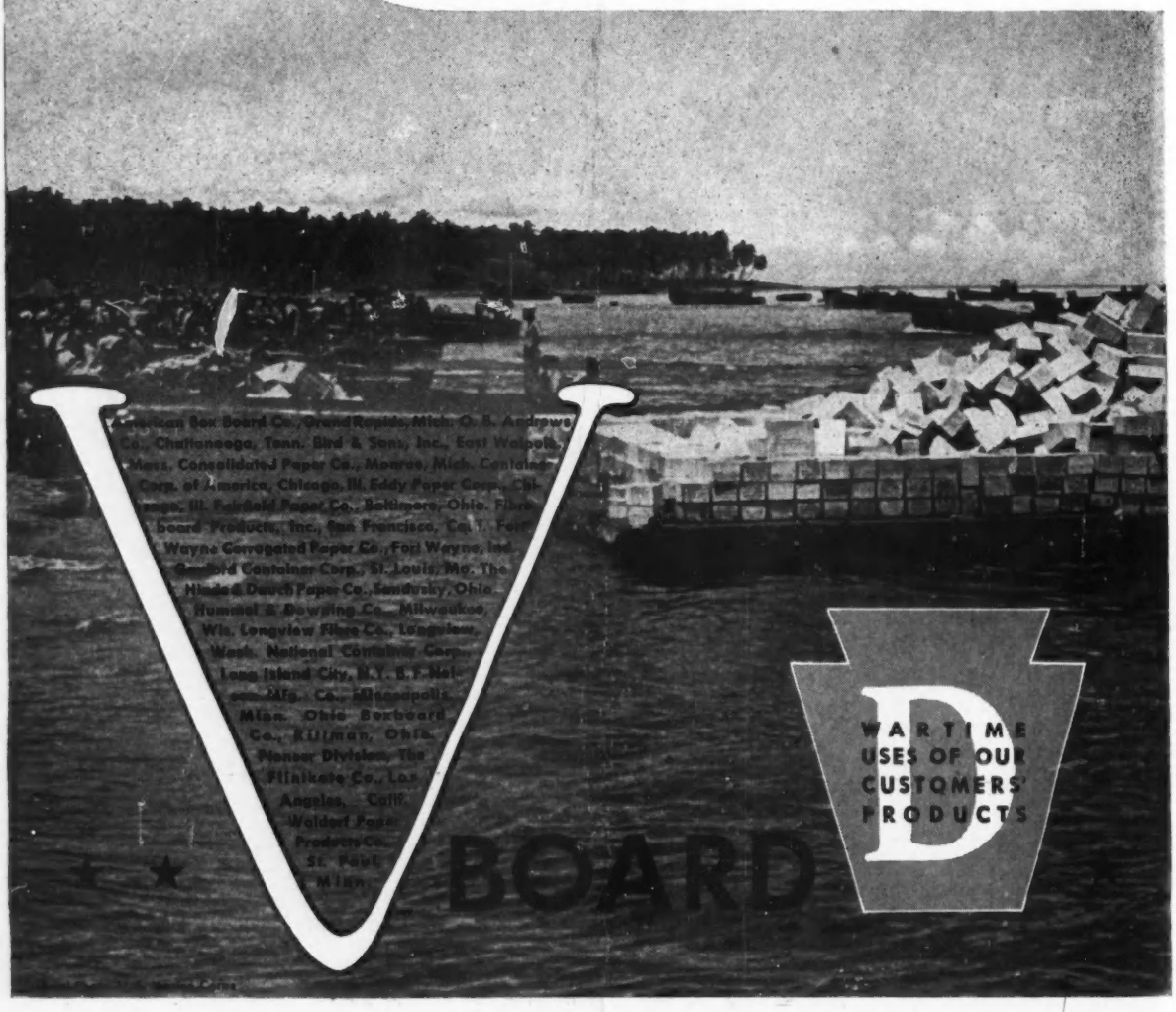
New York Stockholm

DOWNINGTOWN

V-BOARD DESIGNED FOR WARTIME NEEDS DESTINED FOR PEACETIME USES

Early in the war, thousands of tons of food and equipment were made useless, after thousands of mile in transit, because of moisture penetration, insect infestation, rust, breakage, and climatic extremes. This was because the ordinary corrugated container, so satisfactory for domestic shipments, proved useless in protecting shipments made abroad. . . . The Weatherproof Box Group of mills went back to work and developed V-Board to solve the problems of wartime shipping needs. It has proved so successful that many manufacturers claim that after the war they will not even go back to wood for shipping cases. We predict many others will learn about V-Board and will use it. . . . Practically every mill in the country that can make V-Board is now doing so. We don't know who made the V-Board used in the boxes shown in this picture, but we do know that with the aid of Downingtown Machinery, our customers listed in the "V" are equipped to do so. . . . Performance of Downingtown Machinery under the stress of wartime conditions is something for every paper and board mill to remember, or investigate, before ordering post-war equipment. Our Engineering Department is at your service NOW. Downingtown Manufacturing Company, Downingtown, Pa.



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TURN OVER A *New Leaf*

Close the books on red figures for excessive fuel, down time, defective sheets and broke. Begin the New Year by adjusting the bearings of your paper machines. Put in new bushings if necessary. Regrind any rolls that are worn unevenly. Install Hamilton Felts and operate in black ink.

Why HAMILTON Felts? Because Hamilton Felts remove water fast and uniformly. They leave no soft spots to cause the sheet to break, no felt marks to mar the finish. Hamilton Felts undergo no after shrinkage or stretching to make them run "out of true," with frequent stops for adjustment. And because Hamilton Felts deliver dryer sheets they require less steam at the driers.

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E. Engin.

PAPER TRADE JOURNAL
Title Reg. U. S. Pat. Off.

Vol. 118, No. 1 Thursday, January 6, 1944 Price Ten Cents

Drive for More Pulpwood Is Progressing

Domestic Production Gauged By Mill Receipts Showed Improvement In October and November—Total For Eleven Months of 1943 Is 1,089,000 Cords Under Goal Set By War Production Board.

Domestic pulpwood production, as represented by mill receipts, showed some improvement during the fall months of October and November when the 1943 Newspaper Victory Pulpwood Campaign was at its peak, the War Activities Committee of the Pulpwood Consuming Industries stated on January 3.

At the same time, the Committee stated that military and civilian requirements for pulpwood products in 1944 will necessitate an even greater effort by farmers, pulpwood cutters, and part-time woods workers than in 1943, on account of the tightening manpower and transportation shortages.

Mill receipts of domestic pulpwood throughout the nation totaled 11,911,000 cords during 11 months of 1943. This is only 1,089,000 cords under the 13,000,000 cord goal set for the year by the War Production Board, with December figures as yet unreported. Total mill receipts in October were 1,228,000 cords, and in November, 1,115,000 cords.

The wartime decline in pulpwood receipts began in October, 1942, and continued until the early fall of this year when the trend was reversed. Mill receipts have since been well above those of 1942, although the year's total will fall below that of last year because of a 24% drop under 1942 during the first half of this year.

Mill receipts were encouraging in all regions except the Northeast, the Committee reported, and there the inability of industry to obtain its normal complement of Canadian labor was held partially to blame.

Greatest Improvement in South

The greatest improvement was noted in the South, which produces almost half of the domestic supply of pulpwood. This region best reflects the effect of the Victory Pulpwood Campaign because of the short time lag between the cutting and delivery of pulpwood to the mills.

Mill receipts in the Northeast, Lake States, and in the Pacific Northwest do not accurately represent current production as there is often a lapse of six months or more between cutting and mill deliveries due to adverse weather conditions and seasonal transportation habits.

Following are the mill receipts of pulpwood in rough cords by regions:

Region	*October*	*November*	*December*
Northeast	184,000	87,000	1,752,000
Appalachian	118,000	114,000	1,136,000
Great Lakes	124,000	109,000	1,181,000
South	557,000	586,000	5,596,000
Pacific Northwest	245,000	219,000	2,246,000
TOTAL UNITED STATES..	1,228,000	1,115,000	11,911,000

"It is, of course, impossible to say how much of this increased pulpwood production is due to the Newspaper Victory Pulpwood Campaign, but I am confident that these hundreds of local newspaper drives have been largely responsible for the improvement," Frank Block, director of the War Activities Committee, said.

"Letters from mills and newspapers substantiate these statistical reports. Farmers, already hard put to it to meet wartime food requirements, are cutting pulpwood between harvesting and planting and thus are doing a double job for their country. Hundreds of business and professional men, many of whom have never before engaged in woods work, are taking time out to cut a cord or more of pulpwood for the boys in uniform."

There are currently more than 1250 local Newspaper Pulpwood Committees functioning in 27 pulpwood producing states.

Many Newspapers are Cooperating

"The Victory Pulpwood Campaign, however, is by no means over, even though we reach the 13,000,000-cord goal for 1943," Mr. Block added. "The continuing expansion of our Army and Navy, and particularly the growth of our expeditionary forces in the European and Pacific battle zones, call for maximum production on the Home Front during 1944.

"Yet in the face of growing needs for pulpwood to equip our armed forces abroad, we are confronted with serious production problems at home. The draft and war industries have taken many men from woods work.

"Pulpwood has become one of the critical raw materials of our war effort because it is the basic product from which hundreds of items of military equipment and supply are made. It has proved an excellent substitute for many more scarce metals, such as steel and aluminum, and it has the advantage of these in that it can be replaced simply by replanting."

OPA Issues New Rulings on Waste Paper

Regulations of Paper Stock Sales Are Tightened In Attempt To Stamp Out Black Market Activity and Establish More Normal Trading—Some Changes Also Made In Paper Board Regulation.

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., Jan. 5, 1944—As another step in its program to eradicate black market operations in the waste paper industry, the Office of Price Administration today tightened certain provisions of the regulation governing waste paper sales of paperboard east of the Rocky Mountains.

Black market operations, OPA said, already have seriously disrupted the normal channeling back to paper mills of waste paper and made it difficult for honest consumers to obtain their fair share of the limited supply available. Cost increases to industrial consumers have been mounting so unreasonably as to affect gravely both the production and distribution of the vital products for which waste paper is a raw material.

Changes in Waste Paper Regulation

To strengthen the OPA enforcement program, the following changes today were made in the waste paper regulation (MPR 30):

(1) Sales of "unsorted" waste paper at any level (previously exempted below the mill consumer level) hereafter may not be made at a price in excess of the maximum price permitted by the regulation for "No. 1 Mixed Paper." This change is designed to prevent unscrupulous dealers willing to pay more than legal top prices from outbidding honest ones. Under the regulation's former provision, honest dealers found it impossible to compete in obtaining unsorted waste paper because the dishonest dealer would bid more for unsorted paper than he possibly could obtain for it after sorting, unless he deliberately violated the price ceiling on it. Prior to price control in this field, most unsorted waste paper moved at the price for mixed paper; hence today's ruling will not affect previous normal business practices. In those few instances where the new provision might otherwise penalize the owner of waste paper containing valuable fiber, the owner can sort the paper into the grades listed in the regulation before he makes a sale.

(2) Other amended provisions, while not requiring that any large amount of new records be made, do require the waste-paper consumer to keep records of his business transactions. In particular, the consumer must keep complete receiving records and also record and preserve all data relating to any sampling, testing or inspecting operations made by him.

The record-keeping provision also has been expanded to require persons who sell commercially packed waste paper to keep records on all their purchases and sales whether or not the waste paper thus bought and sold was commercially packed.

Also new is a provision that an inventory report be made on waste paper on hand as of December 31, 1943, which will make it possible at any subsequent date for OPA to determine exactly what quantity of waste paper has actually passed through the hands of the waste paper dealer. At the same time this information will make it possible to detect above-ceiling payments by means of invoicing for quantities of waste paper which were in fact not shipped.

Finally, the invoice requirement has been slightly expanded. All sales of commercially packed waste paper hereafter must be invoiced. Formerly, only sales to a consumer had to be invoiced. The new invoice requirement also sets a time limit within which waste paper sellers must render an invoice.

Changes in Paper Board Regulation

Moving to stop recently developed practices in the paper board field which have disrupted normal business practices, unreasonably increased raw material prices and contributed to the development of a flourishing b l a c k m a r k e t in waste paper, OPA also amended one of its paper board price schedules (RPS 32).

Converters of paper board have been forced to go into the open market and make special purchases of waste paper in partial exchange for deliveries of new paper board from manufacturers.

OPA today prohibited sellers of paper board from requiring their purchasers to furnish them with waste paper, and at the same time prohibited purchasers of paper board from furnishing waste paper to their paper board suppliers except to the extent that they did so before issuance of revised price schedules governing paper board sales east of the Rocky Mountains.

For a paper board manufacturer, or other waste paper converter, to require his customers to supply him with waste paper as a condition to the purchase of a manufactured product is contrary to usual trade practice. Prior to price control, box makers and other converters occasionally were required to return their own accumulations of scrap but they never were compelled to go on the market to obtain waste materials for resale to their suppliers.

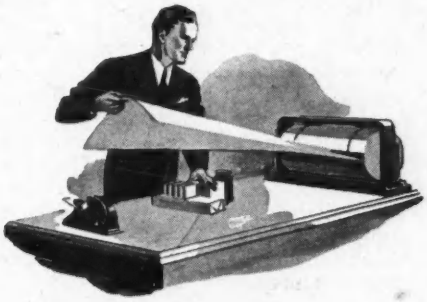
Converters, forced into the waste paper market to satisfy their paper board suppliers' needs, disrupted normal distribution and prices by illegally high biding. Because they are not in business to make a profit from waste paper, they purchased under conditions which caused them substantial losses and made normal operations impossible for regular waste paper dealers, who necessarily must operate on the basis of securing a reasonable profit.

The entrance of the paper board consumer (that is, converters) into the waste paper field also greatly handicapped an intensive enforcement p r o g r a m undertaken by OPA. Since waste paper buying is not a part of the converter's regular business, in many cases separate sets of books were kept on such operations, and in many instances the converters did not appear upon any records of the transactions, since they simply arranged for the waste paper dealer to ship direct to the paper board mill. Largely because it was impossible for converters to break into the normal distribution system of the industry by any other means, in many cases they engaged in black market activities. The black market situation could only be remedied by definitely eliminating converters from the waste paper distribution system, where they do not belong.

PUT MOLD OUT OF BUSINESS

Penicillin is one of the rare examples of mold doing a beneficial job. But for the most part, mold has always been an enemy—especially in your business and in your product.

Dow has devoted many years' research to the development of 17 related products—the Dowicides—to defeat mold and bacteria growth in their attacks on industry. These products are, in a sense, new, but they are nevertheless already doing an outstanding job in putting mold out of business in the paper, paint, textile and leather fields.



Because of high humidity present at most stages of paper manufacture, mold is a serious problem. Since lap-stock retains a high moisture content and is usually stored before use, many manufacturers are now applying Dowicides at the lapping machine. Pulp that is held in stock chests for some time is liable to "sour" and here again Dowicides are defeating mold and protecting the quality of the pulp. Where it is desirable to produce mold-resistant paper —for example, paper for soap wrappers— Dowicides can be added in manufacture as permanent protection against mold. Adhesives used in paper manufacture can be similarly treated. Write to the Dowicide Division for additional details on how to put mold out of business—your business!

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DOW
CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY

Wisconsin Mills Maintain Full Production

Consolidated Water Power & Paper Co., Nekoosa-Edwards Paper Co. and Other Mills Keep Up High Production Ratio By Utilizing Domestic Supplies — Unidentified Disease Infects Pine Stands.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., January 3, 1944—With its supply of Canadian pulpwood decreased by labor shortages and other factors, the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis., has still been able to maintain full production by utilizing domestic supplies to a greater extent, according to Stanton W. Mead, vice-president.

Scarcity of pulpwood loggers in Consolidated's Wisconsin timber tracts has been surmounted by inducements of better working conditions. Many improvements have been made in the way of sanitation, comfortable quarters and quantity and quality of food. As a result, farmers in the north woods area have begun to realize that pleasant, profitable and productive work in the woods during their non-farming seasons is as attractive as the migration to industrial cities. They have therefore returned to the forests to keep the pulpwood moving to Consolidated mills.

Consolidated's appeal to salvage waste paper has also met with a good response, and the community has helped supply the needed materials for the coarser grades of packaging materials.

Resourcefulness and ingenuity to find substitute materials, alteration of manufacturing methods, and conservation and extension of materials have combined to keep production at capacity, resulting in a generally satisfactory operating year.

Consoweld, the new plastic sheets produced out of paper by a lamination and pressure process, is being produced in increasing quantities since it was evolved earlier in the year with the collaboration of the United States Forest Laboratory and the U. S. Army air force. Because of its light weight and strength, it has replaced aluminum and other light weight metals which are scarce. The product has been approved and is in use for many parts of plane and glider construction. Specific among these are glider floors, pilot seats, ammunition boxes, bracing members and others. Wider acceptance is constantly being gained. The plastics division now has 59 employees, many of them highly skilled technicians. Constantly increasing production is anticipated in this division in 1944, and Consolidated hopes to retain its paper mill operations also at a high level.

Reports Higher Production

Production at the Nekoosa-Edwards Paper Company, Port Edwards, Wis., was slightly ahead of 1942, according to John E. Alexander, president and general manager. Sales during 1943 were on a par with those of 1942, and the year's operations were generally satisfactory, notwithstanding the problems of raw materials and supplies, and the personnel turnover due to the war. A great many women have taken over the jobs of men entering the armed forces, and they are doing an outstanding job in this emergency, Mr. Alexander declares.

Plant expansions have not been attempted beyond projects that were started before 1943 and have since been completed. Stress has been placed on maintenance so as to keep all operating equipment in first class shape.

"The outlook for 1944 is one that cannot be divorced from the outlook as to the war," Mr. Alexander said. "We share the general feeling that the war in Europe will be over in 1944. With it there will no doubt be certain readjustments to follow, but these should not be any more difficult than the readjustments from peacetime to wartime operation. Our post-war plans have taken definite shape in the form of new lines we have in mind, one of which will be launched in January of 1944."

Ahdawagam Sales Up in Year

Sales of the Ahdawagam Paper Products Company, Wisconsin Rapids, Wis., will represent an increase of more than 30% for 1943 over 1942, says F. R. Walsh, general manager. Eighty per cent of the current production is for war purposes, he says, consisting of overseas boxes and special containers and tubes for shipping ammunition, field ranges, generators, radar equipment, walkie-talkie pieces and other essential items.

With a backlog of orders covering three to four months production for the machines, Mr. Walsh anticipates the year 1944 should compare well with the present peak rate of production.

"It is difficult to predict what will happen when the war ends," says Mr. Walsh, "but we are still selling many of the accounts we had prior to the war, and most of these people are doing essential war work now. We believe they will change back to their regular lines of manufacture after the war, and we expect to retain these accounts."

Unknown Disease Infects Pine Stands

Concern has been expressed because some of the reforestation effort in Wisconsin will be set at naught by an unidentified disease that has infected several thousand acres of jack and Norway pine, principally in the northern forest areas in Marinette, Oconto, Forest and Florence Counties. Numerous patches of timber have already been destroyed in state and federal forests.

E. L. Chambers, state entomologist, says the disease kills or damages entire stands of pine, then breaks out elsewhere, miles away. Infected trees turn brown and usually die in 2 to 12 months, affecting young and old trees alike.

No method of control has been discovered to date, but research funds are being requested from the federal government and the college of agriculture of the University of Wisconsin to make an investigation. The disease appeared in Wisconsin for the first time this year, and outbreaks are also reported in Michigan and Minnesota.

Investigators have determined that the infection is spread by a variety of spittle bug that deposits its eggs on ferns. The hatched insects feed on pine branches, sucking and infecting the sap. Whether the actual cause of the disease is a virus or fungus has not been determined, Mr. Chambers said.

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3. It requires practically no attention.

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In all principal cities there are experienced De Laval engineers who will give you immediate and competent advice in the solution of drive problems. Ask for Publication W-1131.

DE LAVAL WORM GEAR DIVISION
of the De Laval Steam Turbine Co., Trenton, N. J.

Fear Government Regulation In Peace Time

Midwest Market Beset With Doubt of Future In Possibility of Continued Federal Supervision of Business — Salvage Drive Is Stressed — Salesmen's Party Well Attended — Other Late News.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., January 3, 1944—The Chicago paper market this week faced the new year with considerable doubt as to its outcome. There was no uncertainty from a military standpoint but the possibility of regulation of paper production and distribution carried on into peace times began to match the worries arising from the continued shortage of pulp and the ever present manpower problem.

The newsprint industry found some solace in the Canadian reports of better tonnage and in some quarters the groundwood interests were expecting results in the second quarter of 1944 from the attention now being called to the critical manpower shortage. Krafts and kindred lines were sold up well into 1944 and local representatives of the book and cover market reported increasing pressure from buyers, who gave no intention of being disappointed over quality and grade reductions, so long as they could get paper. Those who watched the increased demand matched against the pulp situation were saying here that "end use" programs would soon come to be the only answer. The board market was far behind and drawing heavily from reserve stocks which will only be replenished by successful salvage drives. The industry was reporting more and more demand from sources which had hitherto used wood pulp, such as the orders for 22,000,000 egg cases now to be made from waste paper.

Paper Executives Press Salvage Drive

Chicago civic and trade organizations were given a very comprehensive picture of why previous salvage drives developed some problems and of why the present drive for waste paper "must not fail", as outlined by J. V. Spachner, vice president of the Container Corporation of America. Mr. Spachner addressed more than one hundred association and civic leaders at a special meeting held at the Morrison Hotel on December 27 under the auspices of the salvage campaign committee of the Chicago Newspaper Publishers Association.

Mr. Spachner forcibly set at rest complaints about the lack of adequate waste paper collection after previous drives had produced good results. He pointed out that previous national campaigns brought excellent response and that more paper came in than the mills could handle, orders that were filled at ceiling prices. "We didn't convert from peace to war fast enough", declared the Container Corporation executive. "The falling off began at the peak of collections and I want to say here and now that I hope we again collect too much paper. If we do, it will mean that America has won the war and then, as now, the paper industry has nothing nor will have nothing to apologize for". Mr. Spachner then stressed the importance of the present drive which has Chicago working double time to get results. He pointed out that winter weather would soon be slowing down waste paper collections and warned that the inventory situation in the industry was alarming. Mr. Spachner pointed out that it would take about 10,000 tons of waste paper a week to permit mills to stop huge inventory losses and to maintain production. "We are losing from three thousand to ten thousand tons a week so far as the board mills are concerned" warned the speaker. "We are, indeed, eating up our inventory at a very alarming rate. That 25 mills are idle and that 100 are practically idling is no news to the industry itself."

After Mr. Spachner's remarks, the Chicago Salvage Committee under the direction of William McFetridge, director, and the Publishers committee headed by John R. Robinson, announced plans for the intensive drive ahead. Pointing out that Chicago is the great national waste paper center, Mr. McFetridge warned that it was up to this area to produce around five to six thousand tons of waste paper a week over and above the normal production, with the entire nation scheduled to strive for an upward jump of from 150,000 to 200,000 tons a week. Three special programs were announced. The first is to be waste paper collection from the schools where regular pick-ups will be made beginning January 17. The second is "curb pick-ups" which begin on January 15 and which will intensify efforts to get civilian householder cooperation in giving up their waste paper. The third feature is the industrial and office building collection program wherein building managers and janitors are cooperating to the fullest extent.

Mr. McFetridge stressed the fact that whereas the industry was formerly somewhat selective in its acceptance of waste paper it "would now take any kind of paper and be glad to get it". Albert Meisterheim, Lloyd Johnston and A. E. Bennett, members of the special industry waste paper advisory groups were also present to tell of their part in the program.

Warns of Shrinking Inventories

"Paper Packs A Punch—Send Yours To War" is the title of a specially written article in the current Illinois Journal of Commerce, written by J. W. Cole, director of the Industrial Waste Paper Drive, Chicago district salvage branch. "Mr. Cole points out that the paper shortage is now so great that Chicago board mills are operating on a 3½ day inventory stock pile; that scrap paper receipts are running around 37,000 tons with weekly consumption around 40,000 tons then causing serious inroads in inventories on hand. Mr. Cole warned, in the article, that while our normal recovery of waste paper is about 20% of all used paper, this figure must be increased to "at least 55% of all available waste paper in order to meet the needs for government and necessary civilian uses". The salvage director urged industrial executives to extend every cooperation in getting over-all acceptance of the salvage drive.

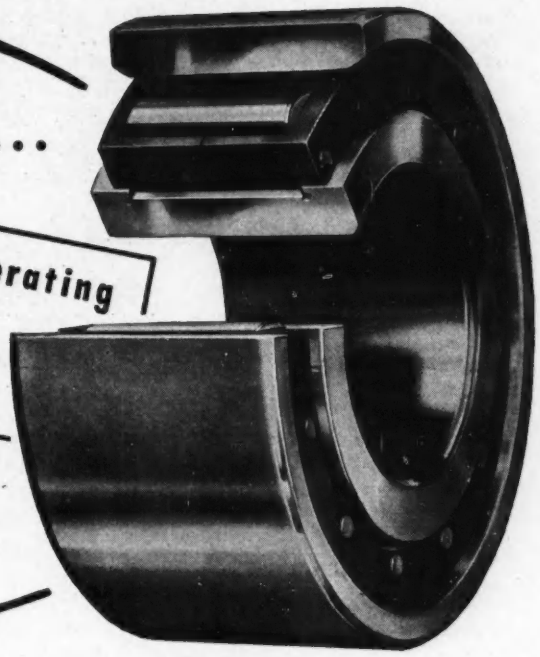
Salesmen's Party Successful

The 1943 version of the Salesmen's Association of the Paper Industry Christmas party will probably go

Make THIS the FIRST AIM of Your Post-War Design...

LOWER Operating and Maintenance COSTS

Dictators may perish, states may fall, but Old King Cost will still rule after this war. Lower operating and replacement costs will be more important than ever . . . not only to survive in the fierce domestic competition that will surely follow, but also to enable American workmen to compete in the world market.



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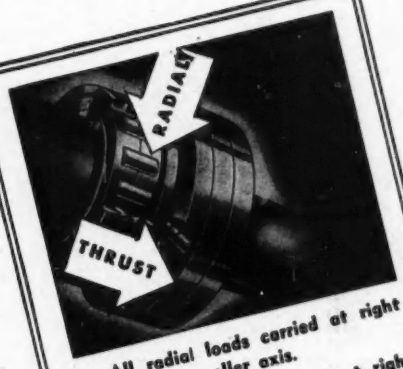
Rollway Right Angle Bearings will make your machines last longer—at lower power, maintenance and replacement costs. That's because right angle loading splits the load into its two components of pure radial and pure thrust. A simplification that reduces the unit loading on rollers and bearings—that insures lower starting and running torque—that holds rubbing and wear-back of roller ends to a minimum—and that guarantees a longer period of precision operation.



● All radial loads carried at right angles to the roller axis.

● All thrust loads carried at right angles to the roller axis.

Examine the cut-away drawing of the Rollway Bearings on this page. See how every load component—both pure radial and pure thrust—is carried at right angles to the roller axis. See how no oblique forces, or no composite forces can pile up on a single bearing. In any given dimensional limit, Rollway Bearings will give you greater load capacity, higher heavy-duty speed or an increased life expectancy of the bearing.

● Available in a wide range of sizes and types in S.A.E. and American Standard metric dimensions and tolerances. Our engineering recommendations may save you both money and future bearing troubles. Send us your designs now for free, confidential bearing analysis.

ROLLWAY BEARING COMPANY, INC., SYRACUSE, NEW YORK

BUILDING HEAVY-DUTY BEARINGS SINCE 1908 — BEARINGS

down in the annals of the western division as the top performance of all. Under the chairmanship and direction of Ben Babbit—who is being given a world of credit for his effort—more than 125 paper salesmen and guests met on December 29 at the Hotel Sherman to do honor to their members in uniform, to pay their respects to all the armed forces, to be entertained and to entertain themselves to their hearts content.

Five members now in uniform were present. They were Col. Dan Hardt, Neenah Paper Company; Corp. Logan Miller, Fraser Industries, Inc., Sgt. Ed Rolain, Mosinee Paper Mills; Capt. E. O. Meyer, Foambeau Paper Company; Capt. Titus, Sixth Air Corps Command and three officers of the British Army who were "captured" in the hotel lobby and invited to attend the festivities. Letters were read from Capt. Sam Pace of the Strathmore Paper Company and Lieut. Bob Keats of the Whiting Paper Company.

While the introductions of members in the armed forces and of the English army guests and the reading of the letters were highlights of the program, there was plenty of impromptu entertainment.

Cites Problems of Paper Board Mills

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., Jan. 5, 1944—New Year problems confronting container manufacturers include a critical transportation situation and lack of fiber and other materials for fabrication of containers, according to a report made to the Transportation Advisory Committee by W. C. Glynn, chief of transportation of the War Production Board Containers Division.

Discussing the critical situation, Mr. Glynn said that weekly revenue freight loadings show an increase of about 10% over the same period of last year, and that industry was expected to reduce its over-all ton-mile requirements by that amount in 1944. A daily box car shortage was also reported in certain areas. The next six months probably would prove the most critical of the war for transportation as the railroads are going into the new year with virtually no margin of unused capacity, handicapped further by the lowered operating efficiency inevitable in cold weather.

The ability of the trucking industry to carry its share of the container traffic is threatened by shortage of tires, manpower, gasoline and replacement parts, which may mean a diversion of additional tonnage to the already overburdened railroads.

While the container industry has done a splendid job in cooperating with common carriers, he said, it is felt that more can be accomplished. He stressed the importance of loading cars as heavily as possible, loading and unloading promptly, and cleaning cars so as to make them available for prompt reloading. The desirability of eliminating unnecessary light weighing of cars, cross hauling, and circuitous routing was urged.

A drive to get obsolete container inventories into circulation is under way to help relieve the shortage of all types of containers. Committee members stated that industry is cooperating successfully in the reuse program.

MONTHLY PRODUCTION OF PAPER AND PAPERBOARD, CLASSIFIED BY TYPE, JANUARY-OCTOBER 1943[1]

(Data for earlier years, and details regarding the composition of the paper statistics are given in the 1942 Census report mentioned in footnote 1)

Types of paper	1942 monthly average	1943 (Tons of 2,000 pounds) January	February	March	April	May	June	July	August	September	October
All types[2]	[3] 1,423,655	1,375,076	1,320,191	1,494,857	1,438,358	1,460,522	1,416,114	1,393,578	1,475,746	1,424,298	1,454,423
Newsprint	80,601	70,340	65,104	72,078	68,109	69,380	70,530	68,612	68,124	64,008	65,336
Groundwood papers	50,847	49,573	46,532	49,546	47,490	46,346	47,458	45,294	51,228	48,571	50,154
Printing	7,918	9,643	8,626	8,635	8,448	7,902	8,825	9,497	9,119	10,143	10,883
Specialties	42,929	39,930	37,906	40,911	39,042	38,444	38,633	35,797	42,109	38,428	39,271
Book papers	143,065	135,850	130,121	146,723	134,593	135,486	132,520	131,179	133,092	132,597	135,107
General printing	90,308	87,175	81,720	89,553	82,542	82,552	81,944	77,940	81,024	80,802	82,507
Converting papers	40,076	35,716	35,051	41,749	35,957	37,881	36,026	37,439	37,508	34,754	35,885
Other book papers	12,681	12,959	13,350	15,421	16,094	15,053	14,550	15,800	14,560	17,041	16,715
Fine papers	86,894	84,820	79,643	91,738	87,189	85,572	85,788	81,765	86,631	80,192	85,370
Writing papers	64,145	60,600	58,058	66,908	63,479	61,275	60,500	58,611	61,701	55,981	58,361
Drawing, cover, text[4]	3,838	4,454	3,807	4,130	3,861	4,758	4,004	5,287	4,446	4,164	4,933
Reproduction papers	5,145	6,672	6,651	7,102	7,498	7,990	8,052	6,895	7,972	8,428	8,818
Bristols	8,051	8,117	6,346	7,978	7,346	6,400	8,357	6,811	7,262	6,739	8,354
Thin papers	4,925	4,553	4,299	5,091	4,590	4,760	4,460	4,080	4,796	4,424	4,511
Other fine papers[4]	790	424	482	529	415	389	415	81	454	456	393
Wrapping papers	210,487	190,379	180,157	197,221	191,971	200,861	181,390	191,166	202,483	189,022	195,373
Bag papers	55,094	50,899	45,113	44,280	47,860	51,312	39,851	46,027	41,396	36,921	37,451
Multi-wall heavy duty sack	20,883	18,648	18,085	26,447	22,627	23,955	25,273	27,294	30,433	28,550	31,796
Wrapping	45,369	35,746	32,429	34,328	32,324	33,806	26,447	26,400	31,715	26,978	25,291
Glassine	6,783	6,512	6,681	7,250	6,507	7,279	7,310	6,939	7,493	6,861	7,057
Greaseproof	1,900	1,950	2,161	2,648	2,503	2,443	2,427	2,485	2,329	2,589	2,319
Vegetable parchment	2,567	2,650	2,749	3,121	2,512	2,795	2,641	2,786	3,000	2,913	2,575
Converting papers	27,005	26,921	27,294	30,824	28,216	32,254	28,497	30,128	34,501	33,193	36,550
Other wrapping papers	50,886	47,053	45,645	48,323	49,422	47,017	48,944	49,107	51,616	51,017	52,334
Special industrial papers	15,658	16,544	14,981	17,747	16,705	16,880	16,261	14,327	17,610	16,825	16,524
Sanitary papers	67,612	69,304	64,801	69,385	68,026	71,888	69,570	61,658	68,752	66,274	68,303
Tissue papers	14,221	13,214	12,880	13,743	13,613	13,830	13,420	13,784	15,044	13,816	13,794
Absorbent papers	5,378	6,230	6,474	6,993	6,872	7,146	7,577	7,778	8,184	7,851	7,647
Building papers	83,448	74,377	71,068	74,767	71,234	66,073	70,222	73,867	74,393	75,749	79,469
Paperboard	[3] 664,099	664,437	648,422	754,899	732,549	747,048	721,368	704,138	750,169	729,380	737,345
Container board	312,953	304,628	308,780	358,624	346,654	353,915	330,827	330,278	360,152	351,990	360,252
Tube stock	13,732	22,351	18,971	24,662	22,553	25,389	26,381	26,978	25,737	27,652	27,144
Folding boxboard	142,650	155,133	147,513	177,920	174,957	176,385	174,829	165,549	178,890	171,083	172,221
Set-up boxboard	83,058	73,418	68,384	75,312	73,644	74,766	72,547	69,189	71,281	65,828	63,565
Cardboard	4,497	5,211	4,830	4,919	5,986	5,845	5,503	4,767	4,821	4,951	5,852
Building board	[3] 87,671	88,979	84,382	96,193	90,833	92,660	93,473	87,965	89,445	86,770	87,334
Other	19,538	14,717	15,562	17,269	17,922	18,088	17,808	19,412	19,843	21,106	20,977

[1] Data presented herein continue the series previously published by the Bureau of the Census on an annual basis. The 1942 statistics as shown here are for 691 mills, as compared with 690 mills shown in the Census of Pulp Mills and of Paper and Paperboard Mills: 1942, dated December 1943. The difference is accounted for by the inclusion here of the estimated production for 1942 of one mill which was operating in 1942 but which reported for the first time in 1943. The 1943 data are for 682 mills; 14 mills discontinued operations in 1942 and five mills started production during 1943.

[2] Includes a small quantity of paper not classified by type.

[3] Includes estimated monthly average production for one mill which was operating in 1942 but did not submit reports until 1943.

[4] In 1942 Drawing Paper was included with Other Fine Papers, but beginning January 1943 it was grouped with Cover and Text Papers.

Here's the "Doctor"

to cure Production Wastes!

Check

THESE APPLICATIONS

Here are just a few of the temperature points where use of Foxboro Temperature Recorders may point out important savings:

PAPER STOCK LINES	BEATERS
DRYERS AND OVENS	GRINDERS
CHLORINE LINES	DIGESTERS
ACCUMULATORS	BLEACHERS
CONDENSERS	SIZE TANKS

Unsuspected temperature fluctuations may be wasting your time, fuel and materials . . . causing needless losses in efficiency. Daily records of these temperatures will show just where the wastes occur . . . enable speedy "diagnosis" and correction!

You can get these records, continuously and inexpensively, with recording thermometers. By specifying Foxboro Temperature Recorders, you'll make sure of getting them *accurately and dependably!*

Foxboro Temperature Recorders are precision-engineered to meet toughest industrial needs for accuracy, endurance and trouble-freedom. Their ultra-sensitive thermal system reacts instantly to slightest temperature changes. Their light, strong recording mechanism "writes it down", day-in, day-out for years without maintenance!

Write for Bulletin 198-2 containing the full story of these automatic aids to waste-elimination. **The Foxboro Company, 114 Neponset Avenue, Foxboro, Mass., U.S.A.** Branches in principal cities of U. S. and Canada.

FOXBORO

REG. U. S. PAT. OFF.

TEMPERATURE RECORDERS

The Story of Amioca

This is the story of an industrial research program which, started many years ago by a foreign missionary's curiosity, has been carried through agricultural and laboratory phases to the point where a commercial crop of a new kind of grain is available, and sufficient quantities have been processed by American Maize Products Company, and tested by Stein, Hall & Co., Inc., to assure its distribution.

Stein, Hall & Co. has cooperated with American Maize in developing Amioca and evaluating it for various industrial uses, such as textile warp sizing, finishing and printing, paper tub, calender and coating work, veneer and laminating adhesives, box and envelope gums and liquid glues.

Goes Back to 1908

The story of Amioca goes back to 1908, when an American missionary, whose mind was not too preoccupied with heavenly things to ignore earthly matters, found growing in China a new variety of corn and sent samples to the U. S. Dept. of Agriculture. The characteristic of this corn which distinguished it from the ordinary variety was that the surface of the cut kernels looked like hard wax. So it was natural for the name "waxy maize" to originate from this waxy appearance, although the kernels do not contain any wax. Present preference is to call this grain glutinous corn, deriving the name from the sticky or glue-like character of the cooked or pasted starch.

Experiments Covered Many Years

The corn which the missionary found was not well developed. The ears were puny and the yields per acre were poor. The U. S. Dept. of Agriculture's experimental station at Iowa State College, Ames, Iowa, became interested, and in conjunction with Iowa State College began developing hybrid having the pertinent characteristics of glutenous corn. These experiments covered a period of many years. American Maize Products Company gave its financial and industrial assistance during the development of these seeds.

In 1942 a small quantity of seed having yields comparable with the best hybrid corns was available, and a small acreage of glutinous corn was planted. The crop was processed commercially by American Maize Products Company. Plant operations presented no great difficulties. Although starch yields were not good, the hybriding experiments were successful, and actual yields per acre were high enough to make glutinous corn a commercial crop. At the same time sufficient Amioca was produced to have it tested for industrial purposes.

How It Differs from Ordinary Corn

Stein-Hall chemists have found that Amioca differs from ordinary corn starch in several respects, particularly in the character of the gels formed when heated with water. Compared with the brittle character of ordinary corn starch gels, Amioca gels are long and gummy; remain in a fluid condition and do not tend to set back to a paste like ordinary corn starch gels, and are substantially clear in appearance as compared with the opaqueness of regular corn starch gels.

In these respects Amioca resembles tapioca flour more nearly than does corn starch. It is chiefly because of these properties that Amioca has been found successful for many purposes which tapioca has served.

Stein-Hall has also found that the resemblance of Amioca to tapioca flour is carried through in enzyme conversions as well as in the formation of dextrines. The amount of liquefying enzymes necessary to convert Amioca to a given viscosity is less than that required with corn starch and more nearly like the amount required with tapioca flour. In the manufacture of dextrines, the amount of acid required to produce dextrines of different types approximates more nearly the amount required with tapioca flour than with corn starch.

In clarity, transparency, and fast tack, dextrines and gums manufactured from Amioca resemble tapioca flour and can be used satisfactorily for a number of purposes where tapioca has been used before.

Shows Up Well for Coating

Clay coating of paper is done with casein, soya bean protein or starch, depending on whether or not water resistance is one of the specifications for the coated paper. Of the various starches used for coating, oxidized starches are generally regarded as the most satisfactory because of the better flow characteristic. Stein-Hall trials have shown that, when compared with oxidized starches, Amioca shows up remarkably well.

Gums made from Amioca bases for boxes, envelopes, tube winding, etc., give results which in most respects are as satisfactory as those made from tapioca flour. In 1943 additional quantities of hybrid seed were available and through contacts with the farmers arrangements were made to plant approximately 3,000 acres. This will make available sufficient grain to produce between four and five million pounds of Amioca early in 1944. Seed is now available for considerably enlarged acreage to be planted in 1944 for use as Amioca in 1945.

The future of Amioca and the rate of its expansion for industrial uses depends on general business conditions both now and after the war.

Explain Incorporation Proceedings

[FROM OUR REGULAR CORRESPONDENT]

BROWNVILLE, N. Y., January 3, 1944—The gossip surrounding the incorporation of another Brownville Paper Company was cleared each week when Lieut. Henry A. Wise, of this section, announced that he had sponsored the move. A statement issued claims that Mr. Wise is the party interested in the newly incorporated concern. The charter of the original Brownville Paper Company expired in March so that concern is not legally in existence. Although Mr. Wise is not a stockholder of record of the defunct concern it is understood that he is the owner of stock through assignment by the Anderson estate. It is understood that the chief purpose for the formation of the new concern is the protection of stockholders of the original Brownville concern against loss of the name to other parties.

STARTING JANUARY 18TH

IT'S UP TO YOU!

STARTING January 18th, it's up to you to lead the men and women working in your plant to do themselves proud by helping to put over the 4th War Loan.

Your Government picks you for this job because you are better fitted than anyone else to know what your employees can and should do—and you're their natural leader. This time, your Government asks your plant to meet a definite quota—and to break it, *plenty!*

If your plant quota has not yet been set, get in touch now with your State Chairman of the War Finance Committee.

To meet your plant quota, will mean that you will have to hold your present Pay-Roll Deduction Plan payments at their peak figure—*and then get at least an average of one EXTRA $100 bond from every worker!*

That's where your leadership comes in—and the leadership of every one of your associates, from plant superintendent to foreman! It's your job to see that your fellow workers are sold the finest investment in the world. To see that they buy their share of tomorrow—of Victory!

That won't prove difficult, if you organize for it. Set up your own campaign right now—and don't aim for anything less than a 100% record in those *extra* $100 bonds!

And here's one last thought. Forget you ever heard of "10%" as a measure of a reasonable investment in War Bonds under the Pay-Roll Deduction Plan. Today, thousands of families that formerly depended upon a single wage earner now enjoy the earnings of several. In such cases, 10% or 15% represents but a paltry fraction of an investment which should reach 25%, 50%, or more!

Now then—Up and At Them!

Keep Backing the Attack!—WITH WAR BONDS

This space contributed to Victory by **PAPER TRADE JOURNAL**

This advertisement prepared under the auspices of the United States Treasury Department and the War Advertising Council

Obituary

Franklin J. Bayless

Franklin J. Bayless, former secretary and treasurer of the Bayless Pulp and Paper Company died on December 20, at his home in Wayne, Pa.

Mr. Bayless was born at Corbettsville, Feb. 12, 1865, and after attending grammer school there, he graduated from Central High School in Binghamton.

For three and a half years, Mr. Bayless was with the Merchants' National Bank in Binghamton as teller and bookkeeper. He then became identified with his brother, George C. Bayless, as a partner in the manufacture of wood pulp and paper. When the business was incorporated in 1893, he became secretary and treasurer of the company. The business was moved to Austin, in Potter County, Pa.

He is survived by his widow, Mrs. Cleone Bayless, a son, Capt. John Bayless of the U. S. Army, and a granddaughter, Caroline Bayless.

Franklin F. Spaulding

Franklin F. Spaulding, treasurer of Spaulding & Tewksbury Company, Inc., the oldest paper board house in Boston, died suddenly at his home on Christmas Eve.

He was the son of the late Benjamin Spaulding, one of the early partners in his firm. He had always resided in the Town of Tewksbury, Massachusetts where his Spaulding ancestors had been among the earliest settlers. He leaves his wife Miriam Wiggin Spaulding and a brother Dr. John Austin Spaulding of Worcester, Massachusetts. He had no children.

Mr. Spaulding had been identified with the paper board and paper indpstry for 33 years, serving as treasurer of his company for the past seven years. As a board man he was well known throughout the mills of Eastern United States as well as to the trade.

His keen interest in travel had taken him several times to the far west and to points in Central America.

His funeral services took place at his home on Monday afternoon, December 27. Burial was in the Old Tewksbury Cemetery near his home.

Harold R. Telfer

Harold R. Telfer, president of the Detroit Sulphite Pulp and Paper Company, Detroit, Mich., died December 28 after an illness of several months.

Mr. Telfer was born at Sarnia, Ontario, April 17, 1896. He served in the U. S. Army in World War I and was a 1920 graduate of the University of Michigan, with an A.B. degree. In 1921 he joined the Detroit Sulphite Pulp and Paper Company, starting in the sales department. In 1932 he became vice-president in charge of sales and was made president in 1936. He was a member of the Masonic Lodge, the Phi Kappa Sigma Fraternity, the Detroit Board of Commerce, and the Detroit Athletic Club.

Surviving are his wife, Agnes, and three children: Corp. Harold R. Telfer, Medical Corps, Sheppard Field, Tex., Dorothy and Mary Ellen. Burial was in Grand Lawn Cemetery.

M. G. Dunnagan

Mervyn G. Dunnagan, district sales manager of S. D. Warren Company, paper manufacturers at New York, died of pneumonia December 30 in New Rochelle Hospital. He was forty-three years old and lived at 435 Highbrook avenue, Pelham Manor. He was born in Walnut Creek, Cal., and was graduated from the University of California in 1923. Surviving are his wife, Mrs. Dorothy Kellogg Dunnagan; two daughters, Miss Ann Dunnagan and Miss Patricia Dunnagan, and two sisters, Mrs. H. E. Knapp and Mrs. Merta Eames.

William H. Stanton

William H. Stanton, former director and works manager of the Philadelphia Quartz Company, Philadelphia, died December 11 at the age of eighty-three. He had been associated with the Quartz Company since 1889, when he assumed the duties of Superintendent of their Anderson, Ind., Works, the oldest PQ Works still producing silicate of soda. He retired from active service in 1919 and pursued as hobbies various earlier interests such as wood turning, travel and family history research. He is survived by his wife, Louise Smith Stanton.

Charles A. Wadsworth

Charles A. Wadsworth of 110 W. 69th street, New York City, died suddenly December 20 of a heart attack. He was the factory agent for Keystone Roofing Company, York, Pa. and represented National Waterproofing Company, Camden, N. J. and Cellulose and Paper Converting Company, Philadelphia, Pa. Mr. Wadsworth had been connected with paper mills and equipment manufacturers in the United States and Canada. Burial took place at Black River, New York. He is survived by his wife, Mabelle Samuels Wadsworth.

Edgar B. Kerst

PHILADELPHIA, Pa.—Edgar B. Kerst, of the sales department of Proctor & Schwartz, Inc., Philadelphia, Pa., died at his home, 31 Hilltop road, Chestnut Hill on December 2, after an illness of several weeks.

Mr. Kerst had been associated with the firm for about 35 years, most of which were spent in sales division.

Wax Papers Under One Regulation

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., Jan. 5, 1944—So that all waxed paper products may be under one regulation, cutter box or household rolls of waxed paper, formerly covered at the manufacturing level by the converted paper products regulation, have been added to the list of products subject to the regulation establishing manufacturers' ceilings for waxed papers generally, the Office of Price Administration announced today.

The established level of maximum prices for these rolls has not been altered. Ceilings are based on October 1-15, 1941, prices.

Robert Gair Acquires Natick Box Co.

The Robert Gair Company, Inc. has acquired the property and business of the Natick Box and Board Company, Natick, Mass. The company will be operated under the style of the Natick Box and Board Division of the Robert Gair Company, Inc.

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Year Ending December 31, 1943

STOCKS

	High	Low	Last
A. P. W.	3⅛	1¼	2
Armstrong Cork Co.	40¾	30	37½
Celotex Corp.	14¾	8⅛	11⅛
Celotex Corp., pf.	21	16½	17¾
Certain-Teed Products Corp.	7⅜	3	4¾
Certain-Teed Products Corp., pf.	72⅜	32½	59⅜
Champion Paper & Fibre Co.	24	18	23¾
Champion Paper & Fibre Co., pf.	109	99¾	108
Congoleum Nairn Co.	25	17½	22¾
Container Corp. of America	23¾	16	20½
Continental-Diamond Fibre Co.	15⅜	7	11½
Crown-Zellerbach Co.	17	11½	16⅝
Crown-Zellerbach Co. pf.	99⅜	81½	98½
Dixie Cup Co.	16¾	10	15½
Dixie Cup Co., pf.	45	38½	44⅛
Flintkote Co.	22⅛	15⅜	19⅜
Flintkote Co., pf.	109	97⅞	107
Robert Gair	4⅛	1⅜	2⅞
Robert Gair, pf.	14⅞	9½	13
International Paper Co.	14¾	8¼	14⅛
International Paper Co., pf.	69¾	45¾	69¾
Johns-Manville Corp.	92½	70	84¾
Johns-Manville Corp., pf.	136	125	126
Kimberly-Clark Corp.	34	25	32½
MacAndrews & Forbes	29	20½	26
MacAndrews & Forbes, pf.	138½	133	138
Masonite Corp.	43¼	31½	38
Mead Corp.	10¾	6	8
Mead Corp., pf. A—6%	89	67¾	82
Mead Corp., pf. B—5½%	78½	60	70
National Container Corp.	13½	10¾	12¼
Paraffine Companies, Inc.	45¼	35¼	43¾
Paraffine Companies, Inc., pf.	106	100	105
Rayonier, Inc.	15⅛	11¼	13½
Rayonier, Inc., pf.	32	26½	29
Ruberoid Co.	28	20½	25
Scott Paper Co.	43	36¼	39½
Scott Paper Co., pf.	115	109¾	111
Sutherland Paper Co.	33	26¾	30
Union Bag & Paper Corp.	11¾	8	9⅝
United Paperboard Co.	5⅞	3⅛	4⅜
U. S. Gypsum Co.	75¾	59	73
U. S. Gypsum Co., pf.	181½	168	170
West Virginia Pulp & Paper Co.	16¾	11¾	16½
West Virginia Pulp & Paper Co., pf.	110	103	105¾

BONDS

Abitibi Pulp & Paper Co., 5s '53	71½	70½	71⅛
Celotex Corp. 3¾s '55	102⅛	100¾	101
Certain-Teed Products Corp. 5½s '48	102	92½	101¾
Champion Paper & Fibre Co. 4¾s '50	....	....	....
International Paper Co. 6s '55	107⅜	104⅞	106½
International Paper Co. 5s '47	105¼	102½	104¼
Mead Corp. 3½ '53	....	....	....
West Virginia Pulp & Paper Co. 3s '54	104¼	102½	103¼

New York Curb Exchange

High, Low and Last for Year Ending December 31, 1943

STOCKS

	High	Low	Last
Great Northern Paper Co.	36	27¼	30
Hummel-Ross Fibre Corp.	5⅛	3	4
St. Regis Paper Co.	4¾	1⅝	4⅛
St. Regis Paper Co., pf.	148	115	148
Taggart Corp.	5⅛	3⅛	4⅞

BONDS

American Writing Paper Co. 6s '61	100	88⅛	99⅜

Sale of Taggart Shares Deferred

The St. Regis Paper Company has notified stockholders of the Taggart Corporation that it has extended to January 31 the time for the purchase of minority holdings in the Taggart Company at $5 a share. While there has been a substantial response to the offer, made on December 15, a number of stockholders have requested additional time.

Marathon Nets $6.08

The Marathon Paper Mills for the year to October 31 reports a net income of $1,286,138, or $6.08 a common share against $1,193,047, or $5.62 a common share, for previous fiscal year.

Plans of the Morley Co.

In connection with the purchase by the Morley Company of the Herkimer Fiber Company and the Holed Tite Division of the International Paper Company, it is stated that the Morley Company has taken over the entire property, including water power rights, etc. and the manufacture of molded pulp products such as egg fillers, etc. will continue uninterupted. Inquiries for these products should be sent direct to Herkimer, N. Y.

As to fiber and leather board, it is not certain when production can again be taken up, as the labor problem has to be solved first. In the meanwhile, inquiries for boards should be sent to Charles G. Keferstein, 400 Madison avenue, New York 17, N. Y., who promoted the purchase of Herkimer by Morley and who has been appointed exclusive sales representative for all fiber or leather boards manufactured by the Morley Company either at Herkimer or at their home plant at Portsmouth, N. H. Mr. Keferstein is well known to the industry, having previously been prominently connected with Brown Company and Perkins-Goodwin Company of New York.

The Morley Company has made great strides in recent years under the able and active leadership of its president, Eugene B. Whittemore.

P. J. Ryan to Head Detroit Plant

Henry H. Reichhold, chairman of the board of Reichhold Chemicals, Inc., Detroit, Mich., announces the promotion of P. J. (Pat) Ryan to vice president in charge of RCI's Detroit plant. In his new position, Mr. Ryan will have complete supervision over all production and technical development at RCI's main plant and, in addition, will continue to serve as technical advisor to the board of directors.

Mr. Ryan, following some ten years' production, development and research experience in the paint, varnish and lacquer industry, joined the RCI organization in 1936 and, in the order named, has served as special technical sales service consultant, director of technical development, production manager and technical advisor to the chairman of the board.

Western Tablet Earns $3.20

The Western Tablet and Stationery Corporation for the year to October 31 reports net income, after $1,235,622 provision for Federal income and excess-profits taxes after deducting post-war refund and debt retirement credit of $104,139, was $600,787, equal to $3.20 a common share. Net income for previous year after $894,675 tax provision was $574,273, or $3.01 a common share.

Dryden Profits Off

The Dryden Paper Company, Ltd. for the year to September 30: reports net profit after $130,000 provision for income and excess profits taxes was $79,577, compared with $160,430 for previous fiscal year.

Hummel-Ross Victory Caravan

On Sunday, December 19, 1943, a waste paper collection in Richmond, Va., was sponsored by the American Legion in cooperation with the Richmond for Victory Salvage Committee. The public was requested to put their paper, tied in bundles, on their front curb, to be collected between 1:00 and 5:00 P.M. One hundred and sixty-five trucks and drivers were loaned by business firms. Three hundred Legionnaires served as truck helpers to pick up and

AN OUTSTANDING FEATURE OF THE DRIVE

load the paper. Excellent publicity in the papers and over the radio, during the preceding week, helped to make the public waste paper conscious. The response was beyond expectations. Every house appeared to have paper out, and approximately 400 tons was collected. Trucks had to work up to seven o'clock. It was impossible to weigh in all of the paper for several days.

One outstanding feature that contributed to the success of the collection was the Hummel-Ross Caravan, furnished by the Hummel-Ross Fibre Corporation, of Hopewell, Va., which was stationed for Friday and Saturday at the most prominent and heavily travelled corner in the business district. The public saw the part paper is taking in the war. People were told over the public address amplifier of the need for paper, when and where to put it out; and all collection details.

The caravan is made up of two large trailer trucks. On one is mounted an Italian Macchi C-200, single-seated fighter plane complete with machine guns. The plane was shot down in the North African campaign. The wings are attached so they can be folded back for traveling. Platforms and steps are provided for the convenience of the public.

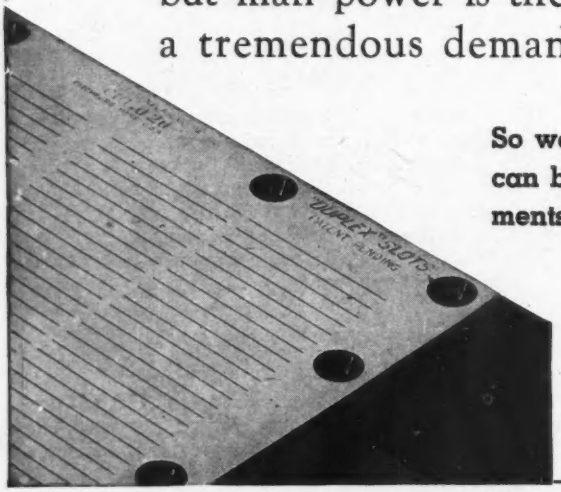
The accompanying trailer is equipped with souvenirs of African battles together with a complete display of "Paper Goes To War." Finished products, made from kraft board, are displayed—smokeless powder, drums, blood plasma and Red Cross boxes, shell-cases, and sturdy boxes especially designed for oversea shipments. A battle scene is shown in a realistic manner.

Uniformed attendants accompany the caravan. A public address amplifier is used to start the show with martial music, followed by an address giving information on the critical need of waste paper and the important part it takes in the war.

This Caravan is a contribution by the Hummel-Ross Fibre Corporation to stimulate the collection and salvaging of waste paper. The caravan is now starting out to cover waste paper collection centers, showing to schools and to assist in all salvage campaigns for waste paper.

Order Screen Plates NOW!

Pulp and Paper Mills used only half as many Screen Plates in 1943 as normally used. Consequently plate inventories are low everywhere. Materials are easier, but man power is the big problem. There will be a tremendous demand for plates in 1944.



So we say *order early*—ORDER NOW—so we can be sure to take best care of your requirements.

Fitchburg Screen Plate Co., Inc.
301 SOUTH STREET
Fitchburg, Massachusetts

Book Paper Use Cut 23 Per Cent

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., Jan. 5, 1944—New restrictions on the use of print paper by book publishers in 1944 approximating a 23.1% average decrease under the 1942 base were announced today by Harry F. West, chief of the Book Publishing and Manufacturing Section of the War Production Board. It is estimated that this WPB requirement will save approximately 39,200 tons of printing paper under the book industry's consumption of 170,000 tons during the base year, 1942.

The figure on consumption is taken from a recent Census Bureau survey of the book publishing industry and replaces the incomplete figure of 142,000 tons, based on a partial tabulation, released on December 20.

The Census Bureau survey also revealed an overall saving by book publishers of better than 10% during the year 1943 as compared with the base year 1942, equaling the saving required of that industry, he added.

The restrictions are effective January 1, 1944, under revised Limitation Order L-245, which differs fundamentally from the original order in five primary respects: (1) Curtailment is applied on a sliding scale by restrictions graduated according to the tonnage of paper consumed in 1942; (2) Interpretation No. 1, issued on March 20, 1943, has been superseded; (3) the restrictions on paper inventories of book publishers have been transferred from Order M-241 to this order and have been relaxed; (4) book publishers are now required to furnish a one-time certification to their printers and paper suppliers; and (5) the terms "book" and "publisher" have been re-defined.

The sliding scale of curtailment was devised because some publishers are not able to reduce their consumption of paper as economically as the larger publishers, Mr. West explained. Under the new method of computing quotas, small book publishers who used 20 tons of paper or less in 1942 may consume in 1944 the same amount used in 1942, without curtailment. Book publishers who consumed in 1942 more than 20 tons, but not more than 100 tons of paper, may use, in 1944, 20 tons plus 85% of the difference between 20 tons and their actual consumption in 1942.

If, for example, a publisher used 80 tons of paper in 1942, he computes his 1944 consumption quota as follows: There is no curtailment on the first 20 tons; to this 20 tons he adds 85% of the remaining 60 tons, which equals 51 tons; thus his consumption quota for 1944 will be 71 tons. The 20-ton exemption does not apply to publishers who used more than 100 tons in 1942. They are limited, in 1944, to 75% of their total 1942 consumption, or 88 tons, whichever is larger.

A. L. Madden Made Commander

BOSTON, Mass., January 3, 1944—A. L. Madden, for many years associated with Carter Rice & Co., Corp., is now Commander in the U. S. Navy and has been assigned to active duty somewhere in the Pacific. He has been Procurement Officer at the Navy's office on Causeway street, this city.

For Economical Conversion of Waste Paper Stocks
The Bauer double-disc pulper is widely used by pulp and paper mills for salvage of rejects and screenings. Treatment fast, thorough and uniform.
Bauerized stock ready for sheet formation normally without jordaning. Investment self-amortizing through economies realized.
Available to mills with preferential rating, and prompt shipment assured.
ARMY E NAVY
Bauer PULPER
THE BAUER BROS. CO. SPRINGFIELD, OHIO, U.S.A.
Bauer
The BAUER BROS. Co.
SPRINGFIELD, OHIO
AVOID ALL WASTE • BACK THE ATTACK • BUY BONDS

R. M. Buckley Made Vice Pres.

The Soundview Pulp Company in Everett, Wash. announces today the appointment of R. M. Buckley as vice-president. Before joining the company in March, 1943, Mr. Buckley has held executive positions in the War Production Board. Prior to that, until February, 1942, he was on the staff of the Kraft Pulp Division of the St. Regis Paper Company in Tacoma, Wash. At present he is active in the New York office of the Soundview Pulp Company.

A native of Montana, Mr. Buckley is a graduate of the University of Washington. He is married and has a three year old son.

C. S. Hamm Heads Mead Engineers Club

At a recent dinner-meeting of the Mead Engineers Club. (Chillicothe Division), C. S. Hamm was elected president. Mr. Hamm succeeds R. H. Savage who had been president of the organization since its origin two years ago. Roy Zellers of the Chillicothe Paper Company was chosen vice-president and J. J. Aid, secretary and treasurer.

The speaker of the evening was Mr. Bennett Chappel, assistant of the president of the American Rolling Mills Company. Mr. Chappel's subject was "The Road Ahead for Engineers in America."

The Mead Engineers Club is composed of qualified employees of The Mead Corporation and the Chillicothe Paper Company.

Allis-Chalmers Announces New Sheave

A new sheave, designed for quick and easy mounting and demounting, has just been announced by the Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin.

Known as the "Magic-Grip" Sheave, it locks to shaft in one tightening operation. As its tapered split bushing, which accommodates normal shaft tolerances, is drawn further into sheave, sheave, bushing and shaft are locked together simultaneously. This positive clamp fit makes sure that the "Magic-Grip" Sheave is perfectly centered and secure . . . assuring smooth running performances free from backlash and shear.

The company states that the new design of the "Magic-Grip" permits sheave to be mounted closer to motor . . . increasing bearing life by reducing shaft overhang. They will be stocked in a complete line at no increase in price.

More complete information concerning "Magic-Grip" Sheaves may be obtained by writing for Bulletin B6310. Allis-Chalmers, Milwaukee 1, Wis.

New Newsprint Mill for Brazil

Formation of Paper and Cellulose Company, known as Companhis Nacional de Papel e Celulose, to manufacture newsprint and other paper products in Brazil, was announced last week. "Printers Ink," trade publication, said that one-third of the capital had been underwritten by existing paper and cellulose mills in Brazil, $500,000 will be subscribed by 400 organizers and the remainder by 140 publishers of newspapers, magazines and other publications.

BE SURE Your Plans Include
Kalamazoo Vitrified
Glazed TILE Construction
for Stock Tanks and Chests

Production Savings and Efficiency

Specify the finest material ever developed for paper and pulp mill tanks and chests. The hard, smooth, glazed surface is ideal for machine chests, bleach tanks, and all storage tanks and chests.

Keeps your stock free from rust, chipped, or flaked concrete and is not affected by most chemicals.

Your first cost is your only cost, with no shutdowns for expensive repairs. Why not have the best when your investment is no more than reinforced concrete or 3 inch cypress chests or tanks?

The Kalamazoo exclusive method of construction is easily adapted to any shape or size with round or square ends, midfeathers, fins or agitators and tapered bottoms and rounded corners.

Saves in three ways by—lowering investment—reducing maintenance—and stepping up production.

Ask for Engineering Data

Kalamazoo TANK & SILO CO.
KALAMAZOO - MICHIGAN

Printing Paper Use Cut

WASHINGTON, D. C., Jan. 5, 1944 —A twenty-five per cent curtailment in the use of commercial printing papers controlled by Limitation Order L-241, effective January 1, 1944, was announced by the War Production Board today. This curtailment, set out in an amendment to the order, is in line with the reductions already made public on print paper used by newspapers, magazines and books.

In 1944, commercial printers will be restricted each quarter to 75% of the paper they used in the corresponding quarter of 1941. Users of certain types of printing such as shopping, free-distribution and want-ad publications in newspaper format, catalogs, except those falling under the book order L-245, directories, excluding telephone directories, and school and college yearbooks are also limited to 75% of the paper processed for such items in 1941.

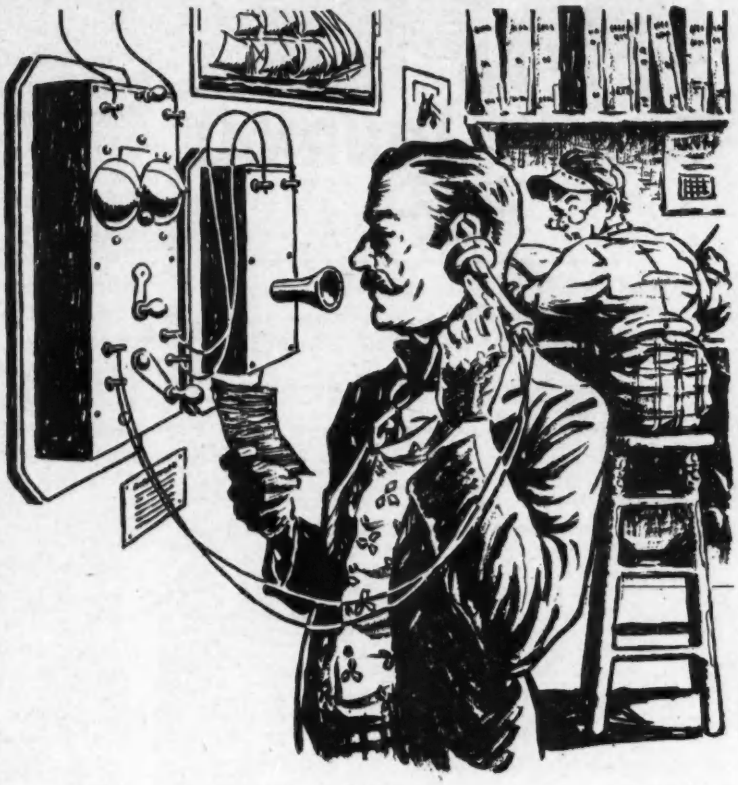
Maximum weights of paper which are permitted for sixteen types of printed products are included in a schedule appended to the order; these weights run from 16 pounds for letterheads and office papers to 140 pounds for card indexes and records. The limitations apply not only to the printers but to the printers' customers and cover paper manufactured since October 21, 1943.

A commercial printer is not limited in the amount of paper he uses in filling Federal, State, county or municipal orders, or in printing official Army and Navy publications.

Issues Reserve Order

WASHINGTON, D. C., Jan. 5, 1944 —All U. S. manufacturers of paper and paper board are required to reserve sufficient time and supplies in each of their mills to produce and deliver 100% of the condenser tissue made by them, 35% of the paper board and 15% of other types of paper to fill governmental orders during the month of January and each month thereafter, the War Production Board Forest Products Bureau announced today. This action was taken to assure sufficient supplies of materials to meet all essential paper and paper board needs, it was explained.

After January 1, 1944, all containerboard allocated under the provisions of Order M-290 will qualify for credit against the 35% requirement of M-241, provided such tonnage is reported and described properly by mills on Form WPB-3270 and filed in triplicate with WPB.



American Pioneers

Alexander Graham Bell patented the telephone in 1876. Picture shows the 1879 model of which there were five thousand in U.S.A.

Twenty years before the Bell telephone was patented in 1878, Draper Brothers were established as woolen manufacturers. It took days to weeks for orders to reach them at that time.

Today we are practically your neighbors. You can talk to us as easily as if we were next door to you.

When you need a felt in a hurry call Canton 0029 — and a **DRAPER FELT** will soon be on its way to you.

Draper Felts Favor Efficiency

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

CANTON, MASS.

OUR REPRESENTATIVES *to serve you*

L. H. BREYFOGLE, Kalamazoo, Mich.

W. L. CAMPBELL, Savannah, Ga.

RALPH E. BRIGGS, Canton, Mass.

E. R. LELOFF, Vancouver, Wash.

PAPER TRADE JOURNAL

Title Reg. U. S. Pat. Off.

Henry J. Berger

EDITOR

Vol. 118 January 6, 1944 No. 1

COMING EVENTS IN PAPER INDUSTRY

American Paper and Pulp Association, Sixty-seventh Annual Convention and meeting, Waldorf-Astoria Hotel, New York, February 14-18.

Technical Association of the Pulp and Paper Industry, Convention, Commodore Hotel, New York, February 14-17.

National Paper Trade Association of the United States, Convention, Waldorf-Astoria Hotel, New York, February 14-17.

The New York Association Of Dealers In Paper Mills' Supplies, Annual Banquet, Commodore Hotel, New York, Tuesday, February 15.

New England Section. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

Delaware Valley Section. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

Lake States Section. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

Kalamazoo Valley Section. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

WAR TAXES

The Congress and the Treasury have been unable to formulate anything approaching a realistic and adequate plan of wartime taxation. The expedient thus far is about the poorest example of a war financing method that could be offered. The weakness of the Administration's fiscal policy is once more seen in this failure to put together an even fairly good revenue act. The hodge-podge plan that has been so laboriously pieced together, like so many ill-shaped bricks that only make an unstable wall, is a lop-sided and rickety piece of work.

In a clear analysis of what a sound tax bill should be and what the incipient revenue act of 1944 now is, Harley L. Lutz, professor of public finance at Princeton University, in an article on "More Realism Needed in War Finance," in the December issue of *The Tax Review,* published by Tax Foundation, 30 Rockefeller plaza, New York, says in part: "The lines were originally drawn in the current phase of the tax controversy in the budget message for the fiscal year 1944, where the President proposed that additional tax revenue of $16 billion be provided in that year. In October, the Treasury presented a tax program which, according to estimates, would produce $10,560 million in a full year of operation. There was no hint, however, as to what this program, if enacted, would add to the receipts by June 30, 1944. This omission has been characteristic of the Treasury calculations, the excuse for which would no doubt be uncertainty as to the date of enactment. Another excuse is provided by the extreme reliance on the income tax, which is still subject to the annual lag in the case of corporation payments, and in the case of individuals to the extent that year-end adjustments are to be made."

In stating the opinion that the most practical form of presentation would be to show what the contribution of a given tax plan would be, Professor Lutz goes on to say that, "The Ways and Means Committee prepared, and the House has passed, under the usual undemocratic but effective 'gag rule,' a tax bill which is estimated to increase the revenues by $2,139.3 million. This estimate is likewise for a full year of operation, and the Committee Report contains no suggestions as to the proportion of the increase which would be realized by June 30, 1944. In one respect, therefore, the entire debate is up in the air. There has been no attempt to make a comparison of the actual difference between the Treasury program and the House Bill so far as concerns their respective contributions to the revenues in the second half of the fiscal year 1944. . . . The Director of the Budget has just published a summary review of the estimates for the fiscal year ending June 30, 1944. There is in this showing good cause for satisfaction but none whatever for complacency. The Ways and Means Committee Report, after briefly summarizing the above results, offers the following astonishing non sequitur: 'Therefore, from the revenue standpoint, the need for additional revenues has apparently been exaggerated; and lower governmental expenditures than estimated would reduce income payments, the net inflationary gap, and pressure on prices'."

Commenting further on this phase, Professor Lutz declares that, "The weak spot in the Committee's position is that it overlooks the fact that there will be a deficit for the year which is now estimated at $57 billion. While this is below the earlier guess, it is still an enormous sum. It is appropriate to rejoice that the public debt may be only $194 billion instead of $210 billion, but the principal emotion should be concern over a debt as large as $194 billion. . . . In the light of the deficit, the mounting debt, and the inevitable reliance, now and later, upon inflationary bank loans, there can be but one answer to the first main question. More revenue is needed and should be sought while the tide of income payments is still at the flood. In this respect the Treasury was right and, if anything, its sights were set too low rather than too high."

In comparing the Treasury program with the Committee program, Professor Lutz states that, "The principal difference in the two plans, aside from the totals, is in the relative emphasis upon the income tax. The Treasury plans would have obtained 72.6% of the total increase by heavier taxes on corporation and individual incomes, while the Committee plan will collect only 36% of the total increase from this source. . . . In short, the tax methods selected by the Treasury would not fully accomplish the purpose which was set in the forefront of their objectives, namely, to aid in the control of inflation by gathering

in promptly a substantial amount of loose or 'hot' purchasing power."

In conclusion Professor Lutz points out that, "The Treasury estimates indicate that persons in the net income classes under $3,000 would pay, in 1944 under the Treasury program, $1,227 million in excise taxes, or almost half of the entire yield of the proposed new excises. When to this increase is added the burden on all small incomes of the Social Security tax increase which the Treasury so enthusiastically advocates, the opposition to a general retail sales tax becomes impossible to justify."

Magazine Paper Cut 25 Per Cent

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., Jan. 5, 1944—Publishers of magazines and periodicals in the United States, with certain exceptions, will be restricted in their 1944 paper usage to 75% of their tonnage in 1942, their base period, Walter J. Risley, Jr., Chief of the War Production Board's Magazine Section of the Printing and Publishing Division, announced today. Publishing Division, announced today. Publishers in the small-tonnage brackets will not be restricted as much as the larger users, he said.

The reduction of paper tonnage, amounting to 25% below 1942, was anticipated by the magazine publishers, and is necessary because of the acute shortage of pulywood and wood pulp.

Quarterly paper consumption quotas require no cut for publishers using five tons or less. A 10% reduction is required if between 5 and 27.8 tons were used in the base period but a minimum use of five tons is permitted. The full 25% cut is required of publishers using more than 27.8 tons although they are permitted a minimum use of 25 tons.

Adjustments permit publishers to borrow an additional 15% of their next quarter's paper quotas, provided they deduct that amount from their quotas in the next period. On the other hand, paper savings effected in one quarter may be used in subsequent quarters.

Similar curtailments in the use of printing paper are also being required of newspaper and book publishers, and commercial printers.

The amended magazine order L-244 becomes effective January 1, 1944, and affects some 2,500 publishers of magazines and periodicals, Mr. Risley said. In 1942, their total print paper consumption was about 950,000 tons; in 1944, it will be 712,500 tons, effecting a saving of 237,500 tons in 1944.

E. M. Allen Made Chairman

E. M. Allen announces his retirement as president of the Mathieson Alkali Works (Inc.) effective January 1, 1944, and the election of G. W. Dolan as his successor. Mr. Allen will continue to hold his office as chairman of the board of directors of the Company. Mr. Allen became president of the company in 1919 and since 1938 has been chairman of the board and president.

Mr. Dolan joined the Mathieson organization in 1930; has held various positions of responsibility and in 1941 was elected Executive Vice President of the Company.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1943		Corresponding Weeks—1942	
November 20	91.0	November 21	86.9
November 27	89.8	November 28	82.3
December 4	91.7	December 5	84.9
December 11	89.6	December 12	88.4
December 18	89.1	December 19	87.9
December 25	70.0	December 26	63.3

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1942	104.5	103.9	102.9	100.4	95.3	87.4	75.8
1943	87.2	88.9	89.5	88.7	91.4	86.4	84.4

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1942	80.8	82.8	90.6	86.9	80.1	90.4
1943	91.1	88.3	90.2	90.6		

COMPARATIVE YEARLY SUMMARIES

	1936	1937	1938	1939	1940	1941	1942	1943
Year to Date..	80.2	80.5	71.7	83.5	86.1	97.3	90.7	88.5
Year Average..	80.4	79.8	71.5	83.4	85.6	97.4	90.4	

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS†

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1937	83	89	89	91	88	80	69	77	72	70	57	47	75
1938	56	63	63	60	60	59	59	60	70	73	67	61	64
1939	65	73	76	74	69	73	68	77	82	91	88	77	77
1940	78	75	74	76	82	85	77	79	78	85	82	77	78
1941	81	88	89	89	91	94	92	98	95	99	98	90	92
1942	102	101	101	95	82	72	68	75	76	81	82	77	84
1943	86	88	94	94	96	94	89	96	94	94	93		

Week ending Nov. 20, 1943—94
Week ending Nev, 27, 1943—91
Week ending Dec. 4, 1943—95
Week ending Dec. 11, 1943—96
Week ending Dec. 18, 1943—96
Week ending Dec. 25, 1943—87

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

U. B. C. May Have Research Institute

Consultations for a $600,000 research institute at University of British Columbia at Vancouver, B. C. are proceeding between the Federal and Provincial governments for aid of the forest products industry.

Suggested for many years by leaders in the industry and members of the forest branch, the project assumed definite form when postwar reconstruction programs were discussed.

Premier John Hart, Hon. Wells Gray, minister of lands, C. D. Orchard, chief forester; D. Roy Cameron, Dominion forester in Ottawa, and Dr. L. S. Klinck, president of University of British Columbia, represent various groups in the discussions.

Under the program the Federal Government will build the institute and provide the machinery. It already supports a forest products laboratory at U. B. C. which conducts experiments on stresses and strains of B. C. lumber for construction purposes and investigates the use of preservatives.

The upkeep of the institute, estimated to cost $150,000 a year, will be maintained jointly by the Provincial Government and industry, should the program be adopted.

Acquires General Felt Co.

Standard Cap and Seal Corporation has acquired General Felt Company of Brooklyn, N. Y., manufacturers of laminated, coated and processed papers, it was announced last week by Harold E. Talbott, chairman of the Standard Cap and Seal Company. Robert Newbold, founder and president of General Felt, will become a vice-president and director of Standard.

Russell McGee, a partner in Harold E. Talbott & Co., was elected president of Standard.

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Section of the
TECHNICAL ASSOCIATION
OF THE PULP & PAPER INDUSTRY
122 E. 42nd St., New York 17, N. Y.
Edited by R. G. Macdonald, Secretary

The Ultimate Strength of Pulp Fibers and the Zero-Span Tensile Test

By James d'A. Clark[1]

Abstract

The tedious direct measurement of the ultimate average strength of fibers may be replaced, for most purposes, by the zero-span tensile test. The work of Hoffmann Jacobsen and others in this field is reviewed.

An improved attachment for the zero-span test is described which appears to have several advantages over previous designs. The nature and mechanism of the test is discussed with the help of experimental data. The results are influenced only to an extremely small extent by the compactness of the test sheet and by its bonding, and to a somewhat greater extent by fiber length.

Although the test is not a fundamental measurement of ultimate fiber strength, it probably constitutes a fairly good indirect measurement of that property. Because of this, and the fact that it is simply and easily carried out on unbeaten pulp test sheets, it is recommended in place of the lengthy and much more arbitrary determination of the maximum bursting strength of a beaten pulp.

The test is reproducible and rises only moderately with beating. The ratio between the normal and zero-span tensile strengths gives a fair indication of the adhesiveness of the fibers.

The tensile strength of the individual fibers has been recognized for a long time as one of the fundamental properties of pulp, but the smallness of the fibers has prevented very much work on its measurement. The more common tests (bursting strength tear, fold, and the usual tensile test) are very indirect and complex measurements of the strength properties of the ultimate fibers, because they include their bonding properties, their length, and other factors. These tests are not fundamental, being primarily "use requirement" tests but as such they are, of course, of considerable importance.

In 1923, Hoffmann Jacobsen *(1)* proposed his "Null Reislange" test, in which he measured the tensile strength of paper with the edges of the two sets of jaws of the tensile tester in contact with each other. He indicated that the results were directly proportional to the average ultimate strength of the fibers.

Tensile Strength of Fibers

Rühlemann *(2)* directly measured the tensile strengths of between 50 and 150 fibers of each of 14 sprucewood pulps (unbleached and bleached to various degrees), and also the percentage elongation before breaking of four of the samples. Their tensile strength, including spring- and summer-wood fibers, varied from about 3 to 30 grams, with averages of from 10 to 12 grams. Their stretch varied from 3 to 8%, with averages of from 4.4 to 6.1%. Progressive bleaching gave uncertain results for the breaking lengths of the fibers, which varied between 27,000 and 35,000 meters, but the decrease in stretch caused by bleaching was continuous for the four samples tested.

Mark *(3)* from the forces required to break the C-C, C-H, and C-O bonds in a cellulose fiber calculated that, if the primary valency chains were continuous, the fiber would have a tensile strength of 800 kg./sq. mm. (0.8 g./sq. μ). Assuming a fiber cross-sectional area of about 160 sq. μ for sulphite pulp, this would give a tensile strength of about 130 grams per fiber (about 10 times Rühlemann's figure), which in turn, gives a calculated breaking length of about 10 times that for a test sheet of unbeaten sulphite pulp. This comparison indicates the importance of the secondary or side bonds in the case of the cellulose fiber and the surface or adhesive bonds in the case of paper, the measurement of which has been recently discussed *(4)*. Nevertheless, the ultimate fiber strength is an important measurement, not only to serve as an indication of the maximum obtainable sheet strength if a satisfactory degree of bonding is achieved by beating or other treatment, but also as a means of indicating the extent to which pulp has been degraded by cooking or bleaching. In other words, it seems clear that for this purpose, such a measurement would serve equally as well as, and no doubt a great deal better than, finding the maximum bursting strength or maximum tensile strength of a pulp developed by beating.

Original Zero-Span Attachment

The zero-span tensile jaws, as originally proposed by Hoffmann Jacobsen, had jaws only 5 mm. broad

A portion of a thesis submitted in partial fulfillment of the requirements of The Institute of Paper Chemistry for the degree of Doctor of Philosophy from Lawrence College, Appleton, Wis., June, 1941.

[1] Member TAPPI; Research Associate, The Institute of Paper Chemistry, Appleton, Wis.; Present address: Quartermaster Depot, Subsistence Research Laboratory, Chicago, Ill.

so as to more intensively and better grip the sample to be tested. He found that, whereas the normal tensile breaking load of a loosely felted commercial paper was only 12% of the load when clamped in the special jaws (the percentage increased to 72 when the span was increased from zero to 1 mm.), a compact sheet of parchment had a normal breaking load of 90T of that when the clamping jaws were together. Accordingly he proposed that the ratio of the normal and the zero-span tensile strength was a measure of the adhesion of the fibers.

The following figures were given for the zero-span breaking lengths of a few pulps:

Unbleached kraft (very strong, unbeaten).....	14,000 meters
Unbleached sulphite (strong).....	7,700 meters
Unbleached soda poplar	4,600 meters

He also tested some cotton fibers aligned at right angles to the edges of the jaws and obtained a zero-span breaking length of 23,000 meters. On making the same fibers into a sheet of paper, he obtained approximately half this value. In a test curve he obtained during the mill beating of a very soft sulphite pulp *(5)*, the zero-span breaking length rose quite rapidly from 3,900 meters to a constant maximum of 5,400 after about 3 hours of beating, during which time the normal breaking length rose from 2,500 to 4,500 meters.

Later Work on the Zero-Span Test

In a thesis published in 1930 *(6)*, Günther described the design of a pair of jaws which he thought would carry out the test more accurately and he subsequently used them to study the influence of high pressures on pulps. Grund and Weidenmüller *(7)* compared the Günther design with the Schopper clamp for the purpose and stated that the former was superior because, by its use, the results obtained were from 5 to 15% higher than with the latter. They gave curves showing the development of the zero-span breaking length for various pulps after beating and others for several different papers. The peculiar thing about the zero-span tests in their beating curves is that they begin to fall quite soon after beating commences. In a later paper, Steinschneider and Grund *(8)* also show that the zero-span breaking length falls from the start of beating to the extent of 10% or more. The writer, however, believes that there was something wrong in the alignment or construction of the jaws which Grund and his coworkers used, because in several of their tables, the normal breaking length of a pulp after beating actually exceeds the zero-span breaking length; thus, for an extra-tough sulphite pulp, the normal breaking length rose to 9,850 meters, at which point the zero-span breaking length was only 9,560 meters, which is not credible if everything was in order.

Moreover, in the new design to be described, the zero-span breaking lengths appear to be considerably higher than those given by Grund; a West Coast bleached sulphite (book grade) for example, which should be weaker than an "extra-tough" sulphite, rose to nearly 14,000 meters after beating, so that by his own criterion, his instrument was probably defective. From work done with the new attachment, the zero-span breaking length inevitably rises with beating; this is in accordance with the previous work of Hoffmann Jacobsen.

Nevertheless, the results given in the very comprehensive paper by Steinschneider and Grund indicate that the zero-span breaking lengths correlate quite well with the stated qualities of the eight different pulps, which they tested in a number of ways, and the maximum normal breaking lengths developed for each after beating correspond quite closely with the initial zero-span breaking lengths (before beating) as they measured them. These relationships would probably not be much affected, except in magnitude, by a change in the construction of the jaws.

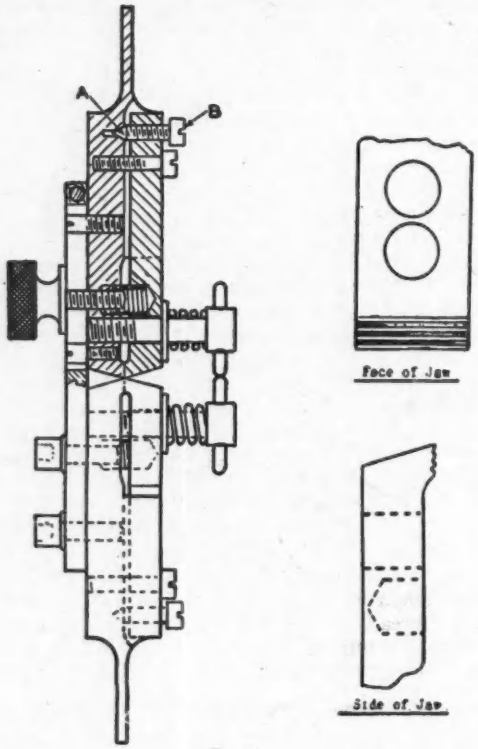

Fig. 1
Zero-Span Jaw Attachment

The Newly Designed Attachment

The design of the zero-span jaws used for the present work is based on that of Günther, with two principal improvements which insure perfect alignment of the jaw edges.

Figure 1 is a part front and part sectional front view of the jaws, which are made of hardened tool steel. Included are front and side views of both the movable and the fixed jaws. The sides of the movable jaws fit snugly into the channels (C) in the fixed jaws, and the countersunk holes (A) in the fixed jaws and the tapered ends of the screws (B) in the movable jaws insure permanent alignment of their edges. A later added improvement was the provision of a lock-nut (not shown) on the tapered ends of the screws (B) so as to hold them perfectly rigid. The faces of the jaws have small serrations, leaving, however, flat areas at their very tips; after hardening, grinding, and assembly, the faces and edges of the jaws are lapped in position, insuring that they fit within 0.0001 inch. The method of adjusting and using the jaws will be clear from the description given in the Appendix.

It is worth noting that a second zero-span attachment, made according to the same design, gave practically identical results on several different kinds of paper when properly adjusted according to the method

suggested. This indicates that the design is reproducible.

Experimental

A. Effect of Tightening the Jaws of the Zero-Span Clamps

The tightness of the jaws has very little effect on the cellophane sheets, and the ratio of the zero-span tensile to the normal tensile test approaches unity—i.e., 100% "adhesion."

With a medium dense sheet, loosening the jaws raises the test appreciably; using the higher test figures, the "% adhesion" is 43% in the cross direction and 60% in the machine direction.

With this soft bulky paper, loosening the jaws makes a very great difference in the results; the "% adhesion" in the cross direction is 31.5%.

After these results were obtained, compression springs were put on the tightening screws to secure uniform tightening on each specimen. As the looser knit sheets suffer the greater reduction in strength when the jaws are tightened, it appears that the fibers, when highly compressed in the nip, are not able to take up the tensile load imposed during the test. This is discussed briefly later.

B. Effect of Beating on the Tensile and Zero-Span Tensile Tests

The individual results given in Tables IV and V were obtained on test sheets made according to TAPPI Standard T 205 m on a West Coast bleached sulphite pulp after having been beaten to various degrees in the Clark laboratory kollergang. R.p.g. is an abbreviation for revolutions of the kollergang runners per gram of pulp being treated and is a unit of beating. A mill making a bond paper would normally treat pulp to between 6 and 10 r.p.g.

The data (which are given in pounds per 15-mm. wide strip) indicate that the variations in the zero-span tensile tests are less than those for the normal 4-in. span employed in the standard tensile test for pulps.

An important fact to notice is that, after a limited amount of beating, the zero-span tensile test does not rise very much, so that a very fair index of the maximum possible normal tensile strength of the pulp could be obtained from the zero-span test of the sheets after only a moderate amount of beating.

TABLE I.—TENSILE STRENGTHS OF CELLOPHANE

Machine Direction—lb.				Cross Direction—lb.				
	Zero-Span	One-Inch Span			Zero-Span		One-Inch Span	
	Medium Clamping	Tensile	Stretch %	Tight Clamping	Medium Clamping	Loose Clamping	Tensile	Stretch %
	5.9	7.5	25.0	4.8	3.7	4.8	4.0	58.0
	6.8	6.6	18.0	4.5	4.4	4.9	4.6	58.0
	7.5	6.7	22.0	4.9	3.8	5.0	4.4	40.0
	5.7	...	...	4.0	4.9	4.9	...	...
	6.5	...	...	...	4.7	...	...	...
	5.8	...	...	...	...	...	...	...
Av.	6.4	...	...	4.6	4.4	4.9	...	...
Av.*	5.95	6.9	21	4.1	3.95	4.35	4.3	52

* Corrected where necessary by subtracting 0.45 lb. for the weight of the upper jaws of the attachment.

TABLE II.—TENSILE TESTS OF TABLET WRITING

Machine Direction—lb.				Cross Direction—lb.		
	Zero-Span			Zero-Span		
	Tight Clamping	Loose Clamping	Two-inch Span	Tight Clamping	Loose Clamping	Two-inch Span
	20.5	22.5	12.6	12.2	13.7	6.4
	22.7	22.0	13.7	12.0	14.7	6.0
	20.7	23.4	13.0	14.0	15.0	5.4
		...	13.3	13.7	15.0	6.2
Av.*	20.8	22.1	13.1	12.5	14.1	6.1

* Corrected where necessary by subtracting 0.45 lb. for the weight of the upper jaws of the attachment.

TABLE III.—TENSILE TESTS OF STANDARD PULP TESTING BLOTTER

Machine Direction—lb.			Cross Direction—lb.		
Zero-Span			Zero-Span		
Tight Clamping	Loose Clamping	Two-inch Span	Tight Clamping	Loose Clamping	Two-inch Span
52	75+	31.4	27.0	64.5	19.0
..	....	33.5	24.0	56.0	17.2
...	....	28.8	25.0	57.0	18.5
Av.* 51.5	75+	31.2	24.8	58.3	18.2

* Corrected where necessary by subtracting 0.45 lb. for the weight of the upper jaws of the attachment.

TABLE IV.—DETAILS OF TENSILE TESTS OF BEATEN PULP

Unbeaten		4 r.p.g.		8 r.p.g.		32 r.p.g.		64 r.p.g.	
Zero-Span	4-in. Span	Zero-Span	4-in. Span	Zero-Span	4-in. Span	Zero-Span	4-in. Span	Zero-Span	4-in. Span
20.0	3.5	25.0	7.7	25.2	11.0	28.6	13.2	27.2	14.5
20.0	3.5	25.7	7.5	25.7	10.0	27.0	(11.5)	27.7	13.4
19.0	3.9	24.7	7.8	27.5	10.4	25.0	12.3	27.1	13.6
19.0	3.2	23.7	7.3	27.5	10.4	25.2	13.2	28.2	13.7
19.8	3.6	24.4	7.8	27.6	11.2	27.0	12.2	27.3	(12.6)
19.7	3.7	...	7.7	27.7	10.0	27.5	12.2	29.2	13.9
19.7	3.6	...	8.2	(24.5)	...	28.7	12.6	28.5	14.2
19.7	..	...	7.7	26.7	...	...	...	...	...
20.5	..	...	8.2	27.5	...	...	...	...	...
Av.* 19.2	3.6	24.2	7.8	26.4	10.5	26.5	12.6	27.4	13.9

* Corrected where necessary by subtracting 0.45 lb. for the weight of the upper jaws of the attachment.

C. Effect of Fiber Length on Zero-Span Test

A quantity of the pulp used in Experiment B was fractionated and the fibers retained on the 20-mesh screen were collected. By means of the sheet machine, this long-fibered fraction was made into pads about 2 mm. thick and then each pad was cut into slices about 0.5 mm. wide with a razor-sharp knife; these slices were then reclassified into four fractions. This procedure insured that the only variable was fiber length, the important factor of fiber width being eliminated in this way. If the classified fractions of the original pulp had been used, as hitherto has been the common practice for experiments with fiber length as a variable, then both length and width (which to a large extent are covariables) would have influenced the results and it would be expected that, under these circumstances, the normal tensile strength could very well rise with decreased fiber length as has been reported. The weighted average fiber lengths by weight given in Table V were determined as described by the author *(9)*.

After testing sheets made from each of these fractions for various properties, in order to study the effect of a beating treatment, pieces from the test sheets were gathered, mixed with some fresh long-fibered stock, and stirred for 300,000 revolutions (100 minutes) in the TAPPI Standard T 205 m disintegrator at 2.4% (double the standard consistency), again fractionated, made into sheets, and tested. The results are given in Table VI.

TABLE V.—INFLUENCE OF BEATING ON PROPERTIES OF BLEACHED SULPHITES

	U*—Not Pressed	U*—Extra Pressed	U*	4 r.p.g.	8 r.p.g.	32 r.p.g.	64 r.p.g.
Basis weight, g./sq.cm.	60.5	65	61.5	61.1	62.5	60.0	59.7
Apparent density (water = 1)	0.298	0.775	0.530	0.645	0.690	0.805	0.885
Breaking length, m.	825	2370	1750	3800	5120	6300	7050
Zero-span breaking length, m.	9,000	9,600	9,450	11,900	12,700	13,200	13,900
Breaking length/zero-span breaking length, %	9.2	25.7	13.5	32.5	40.2	47.6	51.0
Rigidity factor	3.45	118	36	81	98	133	148
Weighted average length, mm.	...	....	2.44	....	1.97	1.16	0.895

* U means unbeaten.

TABLE VI.—SUMMARY OF DATA ON EFFECT OF FIBER LENGTH

	Unbeaten Fractions				Beaten Fractions				
	1 Long	2 Medium	3 Fine	4 Very Fine	1B Long	2B Medium	3B Fine	4B Very Fine	Mixture 50%—1B 50%—4B
Basis weight, g./sq.m.	61.1	62.9	59.2	63.0	68.5	68.2	63.7	65.0	63.7
Apparent density, g./cc.	0.456	0.455	0.451	0.455	0.513	0.508	0.513	0.518	0.535
Tensile, lb./15 mm.	1.33	0.98	0.63	0.71	4.05	3.02	2.18	1.63	2.80
Breaking length, m.	660	470	330	340	1780	1330	1030	750	1320
Zero-span tensile, lb.	18.2	16.1	12.2	11.3	23.4	22.2	17.6	15.5	20
Zero-span breaking length, m.	9500	7700	6200	5500	10,300	9800	8300	7200	9500
Breaking length/zero-span breaking length, %	7.3	6.1	5.2	6.3	18.1	13.6	12.4	10.5	14.0
Weighted average length, mm.	2.78	1.50	0.73	0.52	3.08	1.80	0.92	0.545	1.81

Part of these data have been discussed before *(9)* in a general way, and the somewhat surprising constancy of the apparent density with changing fiber length (but not with beating) has been noted. The quite rapid fall of the zero-span tensile strength with decreasing fiber length is evident, both with the beaten and unbeaten test sheets.

D. The Effect of Added Mucilage on the Tensile and Zero-Span Tensile Strengths

Using the same pulp as in Experiment B, 60 grams (moisture-free) were stirred for 11,000 revolutions in the standard disintegrator in 2 liters of water at 3%. Four standard test sheets were made of portions of the stock with 0, 0.5, 4, and 16% of (air-dry) locust bean gum (based on the dry weight of the pulp). No alum was used, but a greater effect might have been obtained with it. The locust bean gum was prepared by warming a 0.5% suspension to 80° C. and allowing it to stand over night to cool and permit the impurities to settle.

Some of the results are given in Table VII.

TABLE VII.—THE EFFECT OF MUCILAGE ON STRENGTH OF TEST SHEETS

Gum added, %	0	0.5	4	16
Basis weight, g./sq m.	64.3	64.8	66.8	65.1
Apparent specific volume, cc./g.	1.89	1.84	1.75	1.73
Breaking length, m.	1,610	1,900	2,240	2,590
Zero-span breaking length, m.	9,730	....	....	10,530
% Adhesion (ratio of last two tests)	16.5			24.6

The experiment was performed mainly for another purpose and, unfortunately for this discussion, the intermediate values of the zero-span test were not determined. Notwithstanding this, it seems clear that, whereas the normal tensile test was considerably improved by even small quantities of gum, the zero-span tensile test was scarcely affected.

Discussion of the Results

In order to understand the changes in the zero-span tests as recounted in these experiments, it is necessary to consider the mechanism of the test.

Figure 2 illustrates the sequence of tightening the jaws of the zero-span tensile attachment on a test specimen. The strip is shown inserted between the opened jaws in A; when one of the jaws is tightened as shown in B, the specimen is squeezed into a shape somewhat as shown. The other jaw is then firmly closed on the specimen as shown in C; it is clear, depending on the bulkiness of the sheet, that there will inevitably be a zone along the interior of the specimen at X, where not only will there be lateral compression but also a definite longitudinal compression. Therefore, when the specimen is placed under load and the sets of jaws commence to separate, the fibers in the interior zone (at X) will not be able to add their quota to the over-all strength of the specimen until the jaws have separated sufficiently to remove the compression on the fibers in this zone and to subject them to tension. However, because the jaws have to move apart slightly to do this, tension cannot be applied to these fibers until the surrounding exterior fibers of the strip have been appreciably strained, by which time the latter are severely stressed, and it is easy to conceive of the exterior fibers of a very thick soft sheet being actually ruptured before the interior fibers are called upon to exert any tensile pull at all.

This consideration makes it clear why (as in Experiment A) the tests on thicker sheets of blotting paper are considerably affected by the tightness of clamping and why, on the other hand, the clamping pressure scarcely changes the tests on the hard cellophane strips. This, in part, is the reason for the zero-span tensile test increasing with beating, because the bulk then also decreases. However, there is another factor to consider. Notwithstanding the fact that, when the jaws are in proper adjustment, there is virtually a zero-span at the commencement of the test, no load can be applied without a concurrent strain being induced in the material and, the more compact the sheet becomes, as a result of beating, the less becomes the strain required to withstand a given stress, which means that, after beating, the span is also less when fracture occurs. Expressing this idea in other words, it will be recalled that Young's modulus of a material is numerically equal to the stress (in the load per unit area) divided by the strain (in extension per unit length), so that some strain or extension must occur in every material upon the application of a load. The greater the modulus, the less a material is strained with a given load and the modulus of a sheet (which is proportional to its rigidity factor) is greatly increased with beating because the fibers become fibrillated and compacted. To a lesser extent, the addition of mucilage to a pulp also increases the modulus. In the latter case, because unbeaten pulp was used, clamping the relatively soft and bulky paper sample in the nip of the jaws compressed. and to some extent, rearranged the fiber elements, many of the joints were broken, and thus the beneficial effect of mucilage on the zero-span test was diminished. This disturbance of the joints between the fibers of soft unbeaten sheets may well be an added cause for a lowered modulus and thus greater strain before rupture, which results in a lowered zero-span test.

Because the jaws have to separate slightly before much tension is applied to the specimen, very short fibers cannot be gripped by the jaws at both ends and, excepting the part they play as a filler or binding material in the aggregate of the sheet structure, with resulting increase in the modulus, they have no effect on the test result. Moreover, because the test strip is subject to very severe local strains in being clamped by the jaws and by the first slight movement apart of the jaws, it is probable that the bonding effect of short fibers and debris (except for the contribution they make in reducing the size of the compression zone during the clamping) is negligible. It is clear, therefore, that fiber length plays a consider-

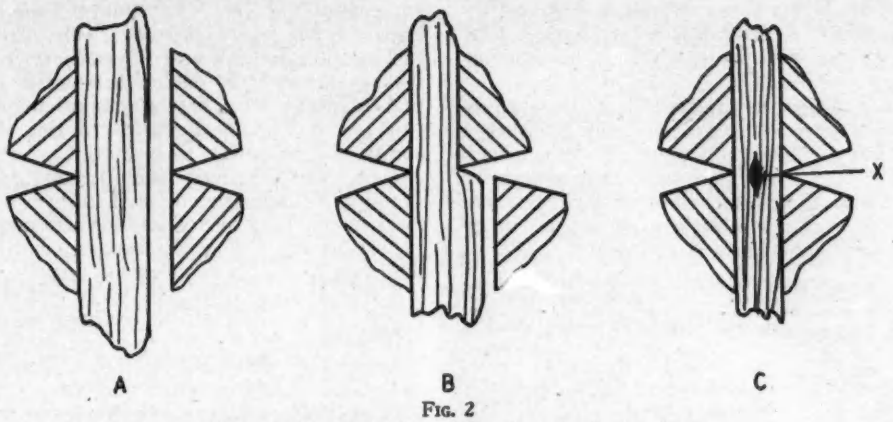

FIG. 2
Effect of Tightening the Jaws of Zero-Span Tensile Attachment

able part in the test and it is not surprising to find that, as in Experiment C, the shorter the fiber, the lower the test, especially with the unbeaten pulp. To go to an extreme, a sheet of fine particled material (such as raw starch) would give a negligible reading, and yet a dry film of cooked starch would give a zero-span reading which would correspond closely to the normal tensile strength of the strip.

Conclusions

From the above considerations, it will be seen that, although the test does not constitute a fundamental measurement of ultimate fiber strength, nevertheless, if the jaws are carefully made and with a pulp having fibers of normal length which have been made into a moderately compact sheet (after the pulp has been slightly beaten), the test should be a fairly good indirect one. Fortunately, it appears to be possible to eliminate variables introduced by slight differences in the construction of well-made jaw attachments because, as noted, the second set of jaws made according to the new design gave test results practically identical with those from the first set.

To those who like to use the maximum bursting strength developed by beating as a measure of pulp quality (which, incidentally, involves the beating of pulp beyond all normal commercial practice), the employment of the zero-span test offers an extremely simple, direct, and reproducible measure of the same kind. Although admittedly arbitrary to a large extent, nevertheless, the zero-span test is not nearly as arbitrary and subject to the same vagaries as the usual determination of "maximum Mullen." The new test is also more informative because, as has been explained, when the normal tensile is also determined the ratio of the two gives a good measure of the adhesion between the fibers, so that it can be seen at once whether the weakness of the sheet is caused by poor bonding or by defective ultimate fiber strength.

APPENDIX

Method for the Zero-Span Tensile Strength Test

This method is suitable for determining the zero-span breaking load of paper or pulp test sheets. The results, when expressed in terms of the breaking length, are a measure of the ultimate tensile strength of the fibers. The ratio of the normal tensile breaking length to the value obtained with this method is a measure of the adhesion or degree of bonding of the fibers comprising the sheet. In the case of machine-made papers, the ratio between the results determined in the machine and cross directions is a good measure of the orientation of the fibers.

APPARATUS

1. A paper tensile strength tester (pendulum type) with provision for setting the jaws 6 inches apart.

2. A zero-span jaw attachment, having hardened steel jaws 15 ± 0.05 mm. wide, the edges and faces of which are in perfect alignment when clamped together (See Fig. 1).

TEST SPECIMEN

For pulp test sheets, cut strips about 1 or 1.5 cm. wide and any convenient length over 1.5 cm.; for paper cut the strips from the two principal directions.

CALIBRATION

Ascertain the alignment of each pair of jaws in the attachment by removing one pair of jaws and drawing a finger nail lightly over and at right angles to the edges of the pairs of closed jaws.

Fix the attachment in the tensile tester with the large knurled screw above the nip and to the left of the operator, the clamps of the tensile tester being spaced 6 inches apart. When the lower clamp of the tensile tester is in its top position, the jaws of the attachment should be together and the weight of the upper clamp assembly of the tensile tester should just rest on the attachment. When the two jaws are pulled together with one hand and the large knurled lock screw tightened with the other, no light should be seen through the line where the upper meets the lower jaw.

Clamp a piece of the paper to be tested in the jaws, when set in position; then unclamp and with a magnifying glass observe the mark of the jaws impressed in the paper. Where the jaws meet, no perceptible ridge should be observable, and the impressions in the paper should be uniform across the jaws. The impressions toward the tip of the jaws should be (if anything) a little heavier than where the inside of the jaws meet. Adjust the screws on the movable jaws until this is attained and the jaws open for a distance of about 1-2 mm. when the clamping screws are loosened. Tighten the lock nuts on the cone-pointed screws and recheck the jaw alignment. Weight the upper jaw assembly. This weight must be subtracted from the tensile tester reading to give the true load on the specimen.

Examine tested specimens for evenness of rupture.

If the edges of the break are ragged, adjustment of the nip clamps is necessary by loosening the lock nuts and turning the pointed screws a fraction further in.

If necessary, adjust the compression of the springs on the clamping screws (for example, with a washer), so that the jaws will clamp a piece of strong paper (doubled or trebled, if need be) sufficiently to support a pull of 70 pounds without slippage. Greater compressive force is not advisable because of the danger of unduly injuring the fibers in the sheet.

Note—There is no need to cut the strip to an exact width of 15 mm., as at fracture, the resistance offered by the strip protruding from the sides of the jaws is negligible, because the paper outside the nip cannot stretch enough to take up any appreciable load before the strip breaks.

PROCEDURE

Insert the specimen strip to be tested between the jaws after properly adjusting them and clamp the strip in position squarely across the sheet direction being tested.

Set the speed of the tensile tester so that the strip breaks in 15 ± 5 seconds (the time seems to be no more or less important than in the normal tensile test). The necessary speed may be determined from a preliminary test.

As soon as a load is put on the attachment, loosen the clamping screw, thus transferring the load to the paper. When it breaks, stop the tester, note the reading on the scale, and remove the broken test strip.

Because of the small clearances available, after the fracture of the specimen, *care should be taken not to reverse a motor-driven tester without first releasing the pawls on pendulum;* keep holding them down until the jaws are together and the lower clamp is in its top position.

Clamp the upper and lower jaws together with the knurled screw, then insert the same strip at a new place or another test strip and repeat the test. For test sheets the results are more uniform than the usual tensile test so that 10 readings are ample. With paper, make at least 10 tests in both directions.

Average the readings and subtract the weight of the upper jaw assembly.

REPORT

For pulp test sheets, give the average reading (corrected for the weight of the lower jaw assembly) to 3 significant figures.

Calculate the zero-span breaking length as:

(Lb. breaking load $\times$ 30,240) / (basis weight in g./sq. m.) meters or (Kg. breaking load $\times$ 200,000) / (basis weight in g./sq. m. $\times$ 3).

For paper, give the average test results for both principal directions as in the normal tensile test.

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TPWP to Relieve Wood Shortage

"The new Timber Production War Project is now operating in New York State to increase the production of lumber, pulpwood and other forestry products needed in the war", said A. B. Recknagel, area director for New York State, at the convocation of students of the New York State College of Forestry, Syracuse University, Monday. This project is financed by the United States Forest Service.

Approximately 40 public foresters of Federal and State agencies have been organized to perform this work. The State is divided according to the availability of man power, each district being assigned to one or more foresters. The foresters are from the Conservation Department, Soil Conservation Service, the United States blister rust agents, members of the faculty of the College of Forestry in Syracuse and the State extension foresters at Cornell.

These trained men will assist small and large forest products industries by supplying information that will offset as far as possible the bottleneck in labor and in obtaining equipment, tractors, trucks and other essential facilities and materials. They will also explain to each sawmill owner and woods operator about deferments and how exempt labor can be temporarily transferred to woods work. The WPB is cooperating in this project.

Forestry and Paper

The story of the importance and wealth of timber in the form of lumber and pulpwood, is interestingly told in "Forestry and Paper," a well illustrated booklet of 32 pages issued by the P. H. Glatfelter Co., Spring Grove, Pa.

The booklet is of general rather than technical interest and supplies much interesting and useful information on species and growth of forest trees, structure of wood, history and approach to forestry. Other chapters discuss land use, selective and other methods of cutting, and pulp mill cooperation with forest operators. Operations in harvesting pulpwood are also described and silviculture and economics are discussed.

The booklet concludes with a map of forest and arid woodland areas of the United States, listing the most commercially important species of trees, with leaves and fruit and major uses. Some useful forest statistics on coverage and ownership, wood measurements and weights and other forest data are included.

The booklet is printed on Glatfelter's Spring Grove Offset paper, manufactured prior to September 1, 1943.

Modern pH and Chlorine Control

A completely revised 83 page combination handbook and catalog (6th edition) of value to every paper plant engineer and operator, is available from W. A. Taylor & Co., 7300 York Road, Baltimore 4, Md. Fifty pages are devoted to (1) a simple, nontechnical explanation of the meaning of pH control and the methods for making colorimetric determinations; (2) precautions to be observed; (3) discussion of the application of pH and chlorine control to 31 different fields, including paper manufacture, boiler water, water purification and softening, etc., (4) a technical discussion of the meaning of pH control. These four sections bring together, in condensed form, information which cannot be obtained elsewhere except by reference to innumerable textbooks and original articles. The remaining 33 pages contain descriptions of Taylor Slide Comparators for general pH and chlorine control, determination of phosphates in boiler water and for analysis of water for iron, manganese, silica, ammonia, etc. A copy will be sent free on request.

Analysis of Rosin Size

TAPPI Tentative Standard T 628 m-43

This method deals with the analysis of those rosin sizes made ordinarily by reacting rosin with an alkali. Paste size, dry size and size emulsions are considered separately. The procedures do not apply to the analysis of colloidally protected sizes, or those containing added ingredients, such as waxes or oils.

It is usually desirable to express results as percentages of the original material and also of the total solids—i.e., on the "dry basis."

Apparatus

Aside from the usual laboratory apparatus, the following are required:

1. *Electric drying oven,* thermostatically controlled to maintain a temperature of 105 ± 1° C. It is advisable also to have under the lower shelf an auxiliary heating coil controlled by a separate switch (in series with a rheostat, if necessary) adjusted so that starting from a temperature of 105° C., an oven temperature of 112 to 115° C. is attained in 15 minutes after the auxiliary heater is turned on.

2. *Flat glass or metal weighing dishes,* diameter 50 mm., depth 12 mm. (aluminum is preferable).

3. *Light filter* (optional). This is required for the determination of free rosin in paste size by the titration procedure only and is a combination of Eastman Kodak Company No. 52 Wratten (in "C" glass) and Corning Glass Works No. 397 Aklo filter. These filters are mounted in a box so that the Aklo filter is closest to the light source in the box and the bottom of the filter combination is 2 inches above the top of a 60-watt frosted electric bulb. The Aklo filter serves to absorb the heat emitted by the light source and thus protect the Wratten filter.

Reagents

A. *Acid-free ether.* Wash a quantity of diethyl ether with sodium carbonate solution and then several times with water. Test the prepared ether with a moist piece of sensitive blue litmus paper, which shall not change color when completely submerged in it for 15 minutes.

B. *Neutral alcohol.* If necessary, neutralize 95% (by volume) ethyl alcohol with a small amount of alcoholic KOH. Then test with a piece of sensitive blue litmus paper, which shall not change color when completely submerged for 15 minutes.

C. *Alcoholic potassium hydroxide solution,* approximately 0.5 *N*. Dissolve 33 grams of KOH in 1 liter of 95% (by volume) ethyl alcohol. Filter off any insoluble carbonates and store in a bottle protected from CO_2 of the air by means of tubes containing soda lime.

D. *Alcoholic KOH solution,* 0.1 *N*. Pipet 100 ml. of the 0.5 *N* alcoholic KOH into a 500 ml. volumetric flask and dilute to 500 ml. with neutral ethyl alcohol. Standardize against 0.1 *N* HCl, using phenolphthalein indicator.

E. *Hydrochloric acid,* 0.1 *N*, accurately standardized.

F. *Hydrochloric acid,* 0.5 *N*, accurately standardized.

G. *Methyl orange indicator solution,* 1 gram per liter.

H. *Phenolphthalein indicator solution.* Dissolve 5 grams of phenolphthalein in 500 ml. of 50% alcohol. Neutralize by adding very dilute alkali cautiously until a faint pink color appears, then just remove the color with a drop or two of approximately 0.01 *N* acid.

I. *Anhydrous isopropyl alcohol,* neutral to moist, sensitive litmus paper.

J. *Isopropyl alcoholic potassium hydroxide solution,* approximately 0.5 *N* (optional). Dissolve 33 grams of KOH in 1 liter of anhydrous isopropyl alcohol. Filter off any insoluble carbonates and store in a bottle protected from CO_2 of the air by means of tubes containing soda lime. Standardize against 0.5 *N* HCl, using thymol blue indicator.

K. *Thymol blue indicator solution,* 1% (optional).

Note: The last two reagents are required only for the determination of free rosin by the titration method.

Paste Size

Rosin size in paste form normally contains 50 to 70% solids. Frequently water will partially separate out on standing and care is required to obtain a representative sample.

Sampling

If the material is supplied in drums, heat the drums until the size is melted, guarding against dilution and loss of moisture. Agitate thoroughly and withdraw approximately equal portions from 10% of the drums of each batch number. Thoroughly mix the samples and fill a moisture-tight quart glass jar with the composite.

If the material is received in a tank car, heat the car until the size is melted and collect four samples by lowering through the dome of the car a rod to which is attached a wide-mouthed bottle or other suitable container closed with a stopper to which a wire is attached, enabling the sampler to collect the sample at any designated level. Collect samples at four different levels: 1 foot below the surface, 1 foot above the bottom, and at two equally spaced levels representing the second and third fourths of the car. Thoroughly mix the samples and fill a moisture-tight quart glass jar with the composite.

As an alternative method, tank cars may be sampled during unloading by collecting four samples from the discharge line representative of each quarter of the car's contents.

Preparation of Sample

Stir each laboratory sample well to insure thorough mixing. If separation of water has occurred, warm the size until with additional stirring it becomes uniform, taking care to avoid loss of water.

Moisture and Volatile Matter

Weigh 1 gram of the original sample (to the nearest 0.5 mg.) into a flat weighing dish. An aluminum dish is preferable since, because of its conductivity, the dish warms up faster, resulting in more efficient

puffing and faster drying of the size. Place the dish containing the sample on the lower shelf of the oven adjusted to 105° C. Turn on the auxiliary heater for approximately 15 minutes. This procedure brings about a rapid heating of the sample which causes it to puff up and dry very rapidly. The oven temperature should reach 112 to 115° C. by the end of the period required to accomplish puffing of the size. After the first 15-minute period remove the dish to an upper shelf in the oven. Turn off the auxiliary heater, which will allow the temperature to drop gradually to 105° C., and continue the drying for 30 minutes longer. Cool in a desiccator and weigh. Replace the dish in the oven on an upper shelf and dry for an additional 15 minutes. Cool and re-weigh. If the second weighing shows a loss of more than 0.5 mg., repeat the drying at 105° C. for 15-minute periods. If the third or subsequent weighing shows an increase (due to oxidation) use the minimum weight in the calculations.

If the auxiliary heater is not available, dry for 1 hour at 105° C. and then repeat for ½-hour intervals until constant or minimum weight is attained.

Calculate the percentage loss as moisture and volatile matter; also the percentage of dry solids. Duplicate determinations should check within 0.1.

Free Rosin

Two methods are given for determining free rosin. The method used should be stated in the report.

The extraction method is more time consuming and includes the unsaponified material along with the free rosin; also there is danger of hydrolysis of some of the combined rosin, which will give high results. On the other hand, it probably nearly approximates the amount of free rosin in the form in which it is actually used in the paper mill. The titration method is faster, but the calculation assumes a knowledge of the acid number of the original rosin. It does not include the unsaponified portion of the combined rosin. Hence the two methods cannot be expected to give identical results. The titration method is mainly suited to control work where the acid number of the original rosin is known or can be ascertained.

1. *Extraction Method.* Weigh approximately 5 grams of the sample (to the nearest 5 mg.) into a 100-ml. tared beaker; dissolve by stirring in 10 ml. of *neutral* ethyl alcohol, adding the alcohol slowly to prevent formation of lumps; transfer to a 250-ml. separatory funnel (*A*); and rinse the beaker three times with a total of 40 ml. of acid-free ether, and finally with several portions of water, not to exceed 35 ml. total, adding the rinsings to the separatory funnel. Mix thoroughly by gentle shaking, avoiding violent agitation which might result in a difficultly separable emulsion.

Let the layers separate and draw off the lower water layer into a second separatory funnel (*B*). Extract this water layer with 25 ml. of acid-free ether, draw off the water into a third separatory funnel (*C*), and add the ether extract to that in funnel *A*. Wash the combined ether extracts in funnel *A* with 25-ml. portions of water, adding the wash water to the solution in funnel *C*. Transfer the ether extracts in funnel *A* to a weighed Soxhlet flask.

Finally extract the total wash water in funnel *C* with 25 ml. of ether, first using the ether to rinse funnels *A* and *B*. Discard the water layer in funnel *C*. Then wash the ether extract still contained therein with 25 ml. of water. Draw off and discard the water and transfer the ether extract to the Soxhlet flask containing the main ether extract. Evaporate the ether by means of a water or steam bath; then place the flask in the oven at 105° C. and dry for 1 hour. Cool in a desiccator and weigh. Repeat the drying for ½-hour intervals until a constant or minimum weight is obtained. Calculate the weight of free rosin to percentage of the original sample.

Note: Rotate the flask frequently during drying to break the surface as the moisture can be liberated more rapidly. Addition of 10 ml. of alcohol to the rosin aids in the drying. Long duration of heating may result in oxidation of the rosin with a consequent increase in weight.

2. *Titration Method* (*1*).—This method is based on the titration in nearly monochromatic light of a rosin size solution in combination with an indicator. The light is obtained by means of a filter whose transmission band is nearly the same as the absorption band of the indicator in alkaline condition. The indicator used in thymol blue, which changes color at a pH range of 8.0-9.6. Thymol blue in acid condition transmits nearly the entire spectrum and thus appears colorless or a pale pink. In an alkaline condition, a strong absorption band appears, thus producing a blue color. In place of noting the usual color change, the end point is noted by observing the point at which the light intensity is sharply decreased. Complete absorption of light will not be obtained because the transmission band of the light filter and the absorption band of the indicator in alkaline condition are not identical.

Weigh 4.0 to 4.5 grams of the size (to the nearest 5 mg.) into a 250-ml. beaker. Dissolve the size in 100 ml. of neutralized anhydrous isopropyl alcohol by adding the alcohol a few drops at a time and stirring it in until a smooth semi-liquid is obtained which can be diluted with larger amounts of the alcohol without the formation of lumps. Add exactly 0.5 ml. of 1% thymol blue indicator solution and titrate with 0.5 *N* isopropyl alcoholic KOH solution over the Wratten filter.

The color after the addition of the indicator is yellow-green. As the addition of alkali progresses, the color changes to a darker green and finally there is a sharp decrease in the amount of light transmitted through the solution. This is taken as the end point. The color range will vary, depending on the color of the rosin used in the size, but the sharp decrease in the amount of light transmitted through the solution will be apparent.

Calculation:

$$\% \text{ Free Rosin} = \frac{\text{ml. } 0.5\,N \text{ KOH} \times 0.173 \times 100}{\text{grams of sample}}$$

Note: The above calculation assumes a rosin acid number of 162. The factor 0.173 is obtained by dividing 28.06 (the number of milligrams of KOH in 1 ml. of 0.5 *N* solution) by 162. If the acid number of the rosin from which the size was made is known to be different from 162, the factor should be changed accordingly.

Total Rosin

Weigh out 3 to 4 grams of the size sample (to 5 mg.) and transfer to a 250-ml. separatory funnel with about 100 ml. of distilled water. Add 2 ml. of conc. HCl, then 25 ml. of diethyl ether. (This need not be neutral ether.) Shake thoroughly, relieving the pressure at intervals through the stopcock. Allow the ether to separate completely and draw off the water layer into a second funnel. Wash the ether layer with three 25-ml. portions of water and transfer the wash waters to the second funnel. Run the ether layer into a weighed Soxhlet flask and rinse the funnel with fresh ether, allowing it to run into the second funnel,

and add 25 ml. more of ether. Shake as before and discard the water layer. Wash the ether layer with two 25-ml portions of water. Add the ether from the second funnel to the Soxhlet flask and evaporate the ether by means of a steam or hot water bath.

Dry and weigh the extracted rosin in an oven at 105° C. as described above under Free Rosin and calculate to percentage of the original sample.

Combined Rosin

This is calculated as the difference between the percentage of total and free rosin.

Unsaponifiable Material

Weigh 3 to 4 grams of the original sample (to 5 mg.) into a 250-ml. Erlenmeyer flask. Add 50 ml. of approximately 0.5 *N* alcoholic KOH and boil for 2 hours under a reflux condenser. Remove from the reflux condenser and place on the steam bath. Evaporate the alcohol to a volume of approximately 15 ml. Cool and transfer to a 25-ml. separatory funnel. Rinse the flask three times with a total of 40 ml. of acid-free ether, and finally with several portions of CO_2-free distilled water, totalling 100 ml., adding the rinsings to the separatory funnel. Proceed as in the determination of free-rosin, with one modification: before adding the ether extracts to the weighed Soxhlet flask, wash with an additional 10 ml. of water. Draw off the water layer and test by adding a drop of phenolphthalein. If, as indicated by a pink color, sodium soaps are present, wash with successive 10-ml. portions of water until no reaction with phenolphthalein is obtained. Finally dry the ether extract, weigh, and calculate the weight of unsaponifiable matter to percentage of the original sample.

Ash

Weigh approximately 1 gram of the sample (to the nearest 0.5 mg.) into a weighed platinum crucible. Place the crucible in a round hole cut in the center of a thick piece of asbestos board. The hole should be large enough to allow the lower half of the crucible to extend below the board. The board is used to keep the burner flame from igniting the vapors produced. Heat cautiously with a gas burner until all volatile matter has been driven off. Increase the temperature and ignite until practically all carbonaceous material is burned off. Finally incline the crucible at about a 45° angle on a clay or fused-silica triangle, heat to a dull red color and rotate the crucible until all the carbon has been burned away. Cool in a desiccator and weigh. Calculate the percentage of ash found.

Note: **Complete combustion of the carbon can be facilitated by moistening the cooled ash with a few drops of water, drying on the steam bath and continuing the ignition. The water treatment may be repeated if necessary.**

Alkalinity of Ash

Place the crucible from the ash determination in a 250-ml. beaker, cover with distilled water and boil. When the ash is dissolved, cool and titrate to a pink color with 0.1 *N* HCl, using two drops of methyl orange indicator. Calculate the alkalinity in terms of sodium carbonate as a percentage of the original sample.

Calculation:

1 ml. 0.1 *N* HCl=0.0053 gram Na_2CO_3.

Free Alkali

This method is based on the insolubility of sodium carbonate and sodium bicarbonate in anhydrous isopropyl alcohol in the presence of rosin size.

Weigh 5 to 7 grams of the size (to the nearest 5 mg.) into a 100-ml. beaker and dissolve in 35 ml. of *neutral* anhydrous isopropyl alcohol by adding the alcohol a few drops at a time and stirring it in until a smooth semi-liquid is produced which can be diluted further without the formation of lumps. Place 15 ml. of isopropyl alcohol over the surface of the mixture in order to prevent the size solution from creeping up the sides of the beaker. Place the beaker in an air-tight container to protect the contents from acid fumes and moisture absorption and let it stand overnight. Filter, using a dry No. 40 Whatman filter paper or equivalent, and wash the residue with small portions of hot, neutral isopropyl alcohol (allowing each washing to drain completely) until the residue is free of rosin size. Remove the filtrate and place a clean 250-ml. beaker or flask under the funnel. Wash the filter paper with small portions of distilled water, collecting the solution in the beaker and using in all about 100 ml. of water which previously has been boiled free of CO_2 and cooled to room temperature. Add 5 to 8 drops of phenolphthalein indicator and titrate with 0.1 *N* HCl until the pink color disappears. Record the titration (a). Then add 2 drops of methyl orange indicator and continue the titration until the color changes from yellow to pink. Record the total titration (b). From the titrations calculate the percentage of free sodium carbonate and bicarbonate.

Calculations:

If a=ml. of acid to phenolphthalein end point, and b=ml. of acid for total titration;

$$\text{then } \%\ Na_2CO_3 = \frac{2a \times 0.0053 \times 100}{\text{grams of sample}}$$

$$\text{and } \%\ NaHCO_3 = \frac{(b - 2a) \times 0.0084 \times 100}{\text{grams of sample}}$$

Dry Size

Dry rosin size normally contains 88 to 97% of solids. The usual physical form is a light powder or small granular particles.

Sampling

If a carload lot is to be sampled, select ten bags or packages representing different locations in the car. Open the bags, discard the first 6 inches of the dry size and collect a half-pint sample from each bag at this level, equidistant from the side walls. Place all of the samples in a clean, dry container of 1 gallon capacity, such as a friction-top can, which can be sealed airtight.

For less than carload shipments, sample five to ten bags as directed above.

Preparation of Samples

Transfer the sample from the container to a clean, dry table top and mix thoroughly with a scoop or large spatula. Quarter, reject two of the diagonally opposite quarters and remix the remaining quarters. Repeat the quartering and transfer two opposite quarters to a 1-quart mason jar. The entire operation should be carried out promptly to avoid change through contact with the air.

Moisture and Volatile Matter

Weigh 2 grams of the sample (to the nearest 0.5 mg.) into a flat weighing dish; dry for exactly 1 hour at 105° C., cool in a desiccator and weigh. Calculate the percentage loss as moisture and volatile matter. Also calculate the percentage of dry solids.

Free Rosin

1. *Extraction Method.*—Weigh 3 grams of the sample (to the nearest 1 mg.) into a 100-ml. beaker and form a paste by adding 10 ml. of *neutral* alcohol with stirring. Transfer to a separatory funnel and complete the determination as described under Free Rosin in paste size.

2. *Titration Method.*—Weigh 2 grams of the sample (to the nearest 0.5 mg.) into a 250-ml. beaker; mix thoroughly with 100 ml. of neutral ethyl alcohol and add 10 drops of phenolphthalein indicator. If the solution does not change color, titrate with 0.1 *N* alcoholic KOH until a reddish color is formed and then add 1 to 2 ml. in excess. Record the total ml. of 0.1 *N* KOH added as *A*. Then titrate with 0.1 *N* HCl to the disappearance of the red color. Call the ml. of 0.1 *N* HCl used *B*. Calculate the percentage of free rosin from the formula:

Calculation:

$$\% \text{ Free Rosin} = \frac{(A-B)\times 0.0346\times 100}{\text{grams of sample}}$$

Notes: (1) The above calculation assumes a rosin acid number of 162. The factor 0.346 is obtained by dividing 5.61 (the number of milligrams of KOH in 1 ml. of 0.1 *N* solution) by 162. If the acid number of the rosin from which the size was made is known to be different from 162, the factor should be changed accordingly.

(2) If the solution turns red when the phenolphthalein is added, free rosin is absent and the solution may be used for determination of free alkali.

(3) Dark-colored samples may be titrated by use of the Wratten filter and thymol blue indicator as described for paste size.

(4) The remarks under Free Rosin in paste size, regarding the applicability of the two methods, apply also to dry size.

Total Rosin

Weigh 3 to 4 grams of the sample (to the nearest 5 mg.) into a 100-ml. beaker, emulsify with hot water, transfer to a 500-ml. separatory funnel and complete the determination as described under paste size.

Combined Rosin

This is taken as the difference between the total and the free rosin.

Unsaponifiable Material

Weigh 3 to 4 grams of the sample (to the nearest 5 mg.) into a 250-ml. Erlenmeyer flask and complete the determination as described for paste size.

Ash and Alkalinity of Ash

Weigh 1.0 to 1.5 grams of the sample (to the nearest 5 mg.) into a platinum crucible and complete the determinations as described for paste size.

Free Alkali

Weigh 2 grams of the sample (to the nearest 1 mg.) into a 250-ml. beaker; mix thoroughly with 100 ml. of *neutral* ethyl alcohol and add 10 drops of phenolphthalein indicator. (The solution prepared for the free rosin determination by the titration method may be used). If the solution turns red on addition of the indicator, titrate with 0.1 *N* HCl until the red color disappears. Designating the ml. of 0.1 *N* HCl required as *A*, calculate the percentage of free NaOH in the sample from the formula:

Calculation:

$$\% \text{ Free Alkali as NaOH} = \frac{A\times 0.0040\times 100}{\text{grams of sample}}$$

Size Emulsions

Rosin-size emulsions, unless clear, transparent solutions, represent a difficult problem of sampling. Milky or cloudy emulsions or solutions from which rosin has precipitated are very difficult to sample and analyze. Such samples must be thoroughly agitated to obtain a uniform dispersion of any settled material.

Since rosin size hydrolizes to a considerable extent when diluted with water, determinations of free rosin and free alkali are meaningless in dilute emulsions or "rosin size milk", such as are used in paper mills. The determinations ordinarily made are those described below.

Specific Gravity

By means of a pipet, fill a weighted 50- or 100-ml. volumetric flask to the mark with the emulsion at 20±1° C. Weigh the flask and contents to the nearest 0.1 gram. Divide the weight of the emulsion in grams by the capacity of the flask in ml. and record the sp. gr. to three decimal places.

Total Solids

Pipet 25 ml. of the sample into a weighed platinum dish. Evaporate on the steam bath to dryness, then heat in the oven at 105° C. for ½ hour, cool in a desiccator and weigh. Repeat the drying for ½-hour periods until the weight is constant or begins to increase. Calculate the minimum weight to percentage of total solids.

Calculation:

$$\% \text{ Total solids} = \frac{\text{wt. in grams}\times 100}{25\times \text{sp. gr. of sample}}$$

Ash and Total Alkali

Ignite the solids in the platinum dish and determine the ash and alkalinity as described under paste size.

Total Rosin

Pipet 100 ml. of the sample into a 250-ml. separatory funnel. Add 2 ml. of conc. HCl and then 25 ml. of diethyl ether. Complete the extraction of the rosin as directed under paste size, except that 25-ml. portions of wash water are used.

Calculation:

$$\% \text{ Total Rosin} = \frac{\text{grams of rosin}\times 100}{100\times \text{sp. gr. of sample}}$$

Literature Cited

1. Georgi, E. A., "Analysis of Rosin Size", *Paper Trade J.* 111, No. 7:37-38 (Aug. 15, 1940).

Imperial Gets Army-Navy E

Glens Falls, N. Y., January 3, 1944—Announcement is made here that the Army-Navy "E" production award has been presented formally to the Chemical Division of the Imperial Paper and Color Company. The presentation of the flag to Karl L. McBride, president of the company was made by Col. Frank J. Atwood, chief of the Rochester Ordnance District.

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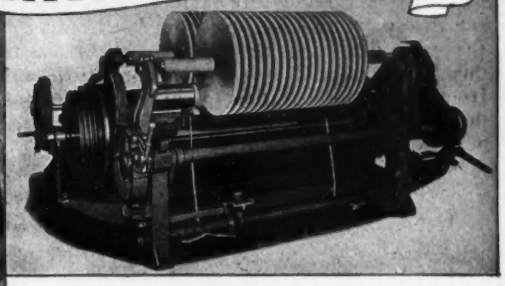

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New York Paper and Pulp Market Review

Paper Demand Continues Heavy — Book Paper Use Curtailed 23 Per Cent In First 1944 Quarter — Pulp Allocation Will Be A Minimum 837,067 Tons Monthly — Waste Paper Collections Up.

Office of the PAPER TRADE JOURNAL.
Wednesday, January 5, 1944.

Heavy demand for all types of paper and paper board is reported by many manufacturers' representatives, jobbers, and general paper merchants at this date. Opinion reflects growing concern at the apprehension of the current trend of government regulation and possibility that federal control may impose serious restrictions on industry and trade in first year or two of the post-war period.

The expected reduction in the use of paper up to about 25% has been put into effect. New restrictions imposing an average reduction of 23% in the use of book paper became effective on January 1, 1944.

The index of general business activity for the week ended December 25 rose to 148.2, from 143.7 for the previous week, compared with 138.1 for the corresponding week last year. The index of paper board production was 142.2, compared with 149.0 for the previous week, and with 146.1 for the corresponding week last year.

Paper production for the week ended December 25 was estimated at 70.0%, compared with 63.3% for 1942, with 79.3% for 1941, with 64.9% for 1940, and with 76.0% for the corresponding week for 1939.

Paper board production for the week ended December 25 was 87.0%, compared with 72.0% for 1942, with 76.0% for 1941, with 48.0% for 1940, and with 46.0% for the corresponding week for 1939.

Waxed papers, under Amendment 1, to MPR 307, will be grouped under one regulation to include cutter box or household rolls, formerly included in the regulation of Certain Converted Paper Products No. 129, regulation.

Wood Pulp

Less wood pulp for the manufacture of paper and paper products will be available in the first quarter of this year. The WPB stated last week that pulp allocation for the first quarter will be a minimum of 837,060 short tons. The highest ratio of pulp to products will be in multi-wall bag, newsprint and groundwood at over 101%; fine papers, 84.6%, coarse papers, 99%; and sanitary papers, 98.5%. Container board will have a ratio of 54.8%; building board, 48.0%, folding boxboard, 23%; and setup boxboard, 0.9%. A maximum reserve of 69,000 tons of pulp monthly will be made by the government for the first quarter for export and non-paper requirements.

Rags

Trading in cotton cuttings is active, with mills freely absorbing supplies in all grades at ceiling prices.

Demand for old cotton rags, particularly the roofing grades, is heavy.

Old Rope and Bagging

Some grades of Manila fiber and old Manila rope are now under control of the WPB Office of Pulp Allocation. Manila fiber, all grades, is restricted to the production of flour, sack, abrasive, and stencil base papers. The sale as well as the use of Manila rope and fiber, as a raw material in the production of rope and certain specified papers, is covered by this directive.

Demand for scrap bagging is only fair at this date. Prices continue nominal.

Old Waste Paper

Some improvement in the quantity of waste paper collections is reported at this date. A full 50% increase has been reported in New York, with very good gains being made in Chicago, Philadelphia and in some other cities. Mill demand is urgent and heavy. Prices are firm.

Twine

Demand for all types of twine and cordage is heavy. Prices on all available grades are firm and unchanged.

New Metallizing Booklets

Catalog 42B, recently issued by Metallizing Engineering Company, Inc., 38-14 30th street, Long Island City 1, N. Y., describes Metco metallizing guns, wires, surface preparing tools and other metallizing accessories in detail. In addition, it tells how sprayed metal coatings are saving critical materials and manpower in the production and maintenance of war-needed parts and equipment.

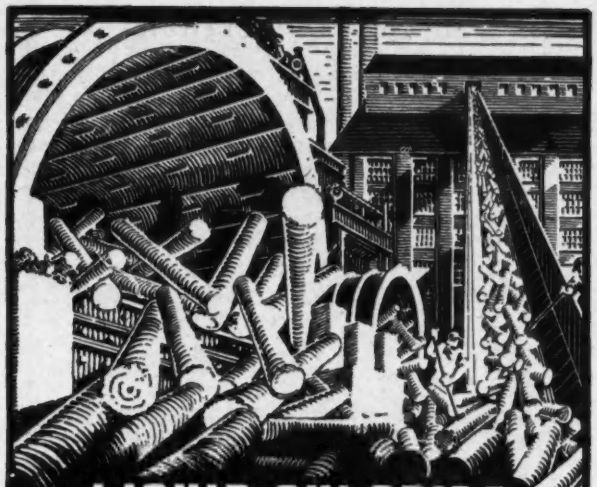
The company is also offering a limited number of copies of its 80-page Metallizing Handbook to present and potential users of the metallizing process. Profusely illustrated with photographs and diagrams, this handbook covers every phase of the process, from surface preparation to spraying techniques and the finishing of sprayed metal coatings. Price $1.00 post paid.

N. A. McKenna Returns to Banking

Following a period in which he was engaged in war service, Norbert A. McKenna will return to the investment banking field on January 1, when he will become a general partner of Reynolds & Co., members New York Stock Exchange.

Mr. McKenna was a general partner of Eastman, Dillon & Co. until October 1940. He was the first director of the Pulp Paper Printing and Publishing Divisions of the War Production Board and instituted the pulp and paper allocation planning in use today. Shortly after Pearl Harbor he became chief of the Production and Scheduling Branch of the Motor Transport Service of the U. S. Army.

Mr. McKenna will be a general investment banking partner of Reynolds & Co., in charge of brokerage and retail distribution departments.



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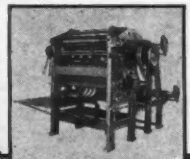
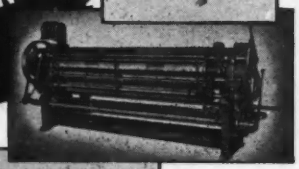
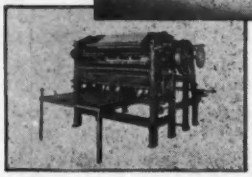






Above are three machines of our varied line, available to you when Victory comes.

Because we'll be better equipped than ever before to meet your requirements for paper reconverting machinery and parts.

Our plant facilities have been devoted to tools—much of it precision work of a high degree—and equipment for our fighting forces.

PAPER CONVERTING MACHINE CO.
GREEN BAY, WISCONSIN
Manufacturers of paper converting machinery for all purposes

MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL.
Wednesday, January 5, 1944.

BLANC FIXE—Quotations on blanc fixe continue unchanged. Demand is reported moderate for the current week. The pulp is quoted at $40 per ton, in barrels, at works. The powder is currently quoted at $60 per ton, f.o.b. works.

BLEACHING POWDER—Demand for bleaching powder is reported active at this date. Supply is quite well balanced with all requirements. Current quotations range from $2.50 to $3.10 per 100 pounds. All prices in car lots, in drums, f.o.b. works.

CASEIN—OPA maximum prices on processed acid-precipitated casein are as follows: 10,000 pounds or more, 24 cents per pound; 2,000 pounds, 24¼ cents per pound; less than 2,000 pounds, 24¾ cents per pound, f.o.b. shipping point. Imported, 11 cents per pound, f.o.b. source.

CAUSTIC SODA—Demand still reported heavy and the supply situation is slightly improved. Prices are unchanged. Solid caustic soda is currently quoted at $2.30 per 100 pounds; flake and ground at $2.70 per 100 pounds. All prices in drums, car lots, f.o.b. works.

CHINA CLAY—Quotations on china clay are unchanged. Demand is reported moderate. Domestic filler clay is currently quoted at from $7.50 to $15 per ton; coating clay is quoted at from $12 to $22 per ton, at mines. Imported china clay is currently quoted at from $13 to $25 per long ton, ship side.

CHLORINE—Supply situation in chlorine reported more satisfactory. Demand is active. Prices remain unchanged. Chlorine is currently quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b. works.

ROSIN—Quotations on some grades of rosin are lower at this date. "G" gum rosin is currently quoted at $4.00 per 100 pounds, in barrels, at Savannah. "FF" wood rosin is currently quoted at $3.95 per 100 pounds, in barrels, at New York. Seventy per cent gum rosin size is currently quoted at $4.26 per 100 pounds, f.o.b. works.

SALT CAKE—Demand for salt cake is reported moderate at this date. Quotations continue to conform to prevailing prices. Domestic salt cake is currently quoted at $15 per ton, in bulk; chrome cake is currently quoted at $16 per ton. All prices in car lots, f.o.b. shipping point.

SODA ASH—The market for soda ash continues active and the supply situation is a little improved. Prices continue to conform to prevailing quotations. Prices on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—A little more cash corn is coming into the market but the supply situation is still reported as tight. Prices on starch continue unchanged. Pearl is currently quoted at $3.10 per 100 pounds; powdered starch as $3.20 per 100 pounds. All prices in bags, car lots, f.o.b. Chicago.

SULPHATE OF ALUMINA—Market reported in satisfactory balance between production and consumption. Quotations continue unchanged. Prices on the commercial grades are currently quoted at from $1.15 to $1.25 per 100 pounds; iron free is currently quoted at $2.35 per 100 pounds. All quotations in bags, car lots, f.o.b. works.

SULPHUR—The demand for sulphur continues active. Quotations on all grades continue to conform to prevailing prices. Annual contracts are currently quoted at $16 per long ton, f.o.b. mines. Contracts at Gulf Ports are offered at $17.50 per long ton.

TALC—The market for domestic talc continues to be reported as moderately active. Quotations remain unchanged. The domestic grades are currently quoted at from $16 to $21 per ton, at mines.

MARKET QUOTATIONS

All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March 1942, showing quotations of actual shipments, will establish the current maximum prices.

Paper

(Delivered New York)

News, per ton—

Roll, contract	*$58.00	@	—
Sheets	64.00	"	—

* OPA Maximum Price.

Kraft—per cwt.—Carload Quantities Zone A, f.o.b. Mill

Superstandard Wrapping	*$5.25	@	—
No. 1 Wrapping	*5.00	"	—
Standard Wrapping	*4.75	"	—
Standard Bag	*4.375	"	—

* OPA Manufacturers' Prices.

Tissues—Per Ream—Carlots

White No. 1	1.12½	"	—
White No. 1 M. G.	1.10	"	—
White No. 1½	1.00	"	—
White No. 2	.90	"	—
Anti-Tarnish M.F.	1.20	"	—
Colored	—	"	—
Kraft	.95	"	—
Manila	.90	"	—

Toilet—1 M. Sheets—Per Case

Unbleached	4.25	"	—
Bleached	5.70	"	—
Unbl. Toilet, 1 M.	4.16	"	—
Bleached Toilet	5.70	"	—

Paper Towels, Per Case—

Unbleached, Jr.	2.60	"	—
Bleached, Jr.	3.20	"	—

Manila—per cwt.—C. l. f. a.

No. 1 Jute	11.25	@	—
No. 1 Manila Wrapping, 35 lb.	6.00	"	6.25
No. 2 Manila Wrapping, 35 lb.	5.75	"	6.00

Boards, per ton—

News	*48.00	@	—
Chip	*48.00	"	—
Sgl. Mla. Ll. Chip	*60.00	"	—
White Pat. Coated	*75.00	"	—
Kraft Liners 50 lb.	*63.00	"	—
Binders Boards	84.00	"	116.00

* OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5.; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
100% Rag Ext. No. 1	$39.10@$46.00	$40.25@$47.25
100% Rag	32.20 " 37.75	33.35 " 39.25
85% Rag	.... "	29.90 " 35.00
75% Rag	23.00 " 27.00	24.15 " 28.25
65% Rag	.... "	22.80 " 27.75
50% Rag	18.70 " 22.75	19.90 " 24.25
25% Rag	16.40 " 20.00	17.55 " 21.50

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items. Delivered in Zone 1:

	Bonds	Ledgers
No. 1	$10.55@$12.75	$11.70@$14.25
No. 2	9.65 " 11.75	10.80 " 13.25
No. 3	9.20 " 11.25	10.35 " 12.50
No. 4	8.90 " 10.75	10.05 " 12.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper. Delivered in Zone 1:

No. 1 Glossy Coated	$13.65	@	$13.50
No. 2 Glossy Coated	12.40	"	14.00
No. 3 Glossy Coated	11.60	"	13.25
No. 4 Glossy Coated	11.15	"	12.75
No. 1 Antique (watermarked)	10.25	"	11.75
No. 2 Offset	9.60	"	11.00
A Grade E. F.	9.35	"	10.75
A Grade S. & S. C.	9.60	"	11.00
B Grade E. F.	8.85	"	10.25
B Grade S. & S. C.	9.10	"	10.50
C Grade E. F.	8.55	"	9.75
C Grade S. & S. C.	8.80	"	10.00
D Grade E. F.	8.25	"	9.50
D Grade S. & S. C.	8.50	"	9.75

Ivory & India at $.50 cwt. extra.

Wood Pulp

OPA Maximum Prices and Canadian Manufacturers Prices, Less Freight, Not Exceeding OPA Allowances.

Bl. Softwood Sulphite	$76.00		
Unbl. Softwood Sulphite	65.00	@	66.00
Bl. Hardwood Sulphite	73.50		
Unbl. Hardwood Sulphite	63.50		
Bl. Mitscherlich	81.00		
Unbl. Mitscherlich	72.00	@	82.00
N. Bleached Sulphate	86.00		
S. Bleached Sulphate	79.00		
N. Semi-Bleached Sulphate	82.00		
S. Semi-Bleached Sulphate	75.00		
N. Unbl. Sulphate	73.00		
S. Unbl. Sulphate	63.50		
Bl. Soda	66.00		
Unbl. Soda	62.00		
Groundwood	46.00		

Transportation Allowances Applying to Producers of Wet Wood Pulp.

	Below 50% Air Dry Weight
Northeast	$13.50
Lake Central	13.50
Southern	16.00
West Coast (in area)	10.50
West Coast (out area)	16.50

	50%-80% Air Dry Weight
Northeast	$11.50
Lake Central	11.50
Southern	14.00
West Coast (in area)	9.50
West Coast (out area)	15.50

Applying to Producers of Dry Wood Pulp.

	Above 80% Air Dry Weight
Northeast	$8.50
Lake Central	8.50
Southern	11.00
West Coast (in area)	7.50
West Coast (out area)	13.50

Should freight charges actually exceed these allowances, the difference may be added to the maximum prices

Domestic Rags

New Rags

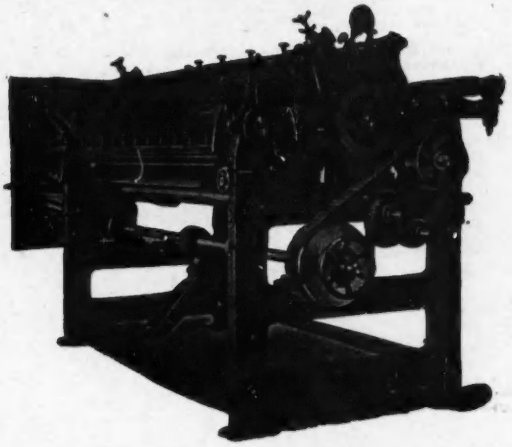
(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—New White, No. 1	6.50	@	7.25*
Silesias No. 1	—	"	5.75*
New Unbleached	6.75	"	7.50*
Blue Overall	—	"	5.50*
Fancy	—	"	3.50*
Washables	—	"	3.00*
Bleached Khaki Cuttings	—	"	4.25*
Unbleached Khaki Cuttings	—	"	3.50*

* OPA Maximum Prices.

MODEL 28

ROLLER BEARING CUTTER



HAMBLET MACHINE CO.

LAWRENCE, MASS.

MAKERS OF

SINGLE, DUPLEX AND DIAGONAL PAPER CUTTERS
CUTTER KNIVES, PATENT TOP SLITTERS.

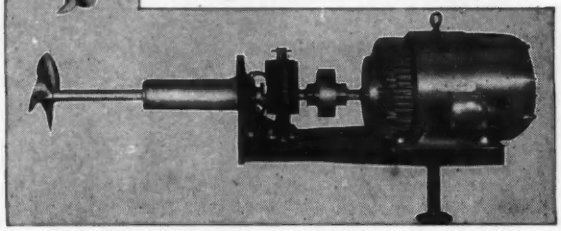
THE RIGHT MIXER FOR YOU

Getting the right mixer first will go a long way toward solving your mixing problem. Here at Eastern our solution of mixing problems from 1/1000th H.P. laboratory stirrers to huge blending tanks requiring 150 H.P. of mixing per tank enables us to find the right answer for your mixing needs quickly.

Vertical, Side Entering, Portable models in all metals available for prompt shipment. Write for Catalog Manual.

EASTERN ENGINEERING COMPANY
54 Fox Street
NEW HAVEN 6, CONNECTICUT

EASTERN MIXERS



WORKING **LIBERTY**

AFTER 115 YEARS

of faithful service to the paper industry, we have temporarily ceased manufacturing new equipment and are devoting the greater part of our resources to the war effort. With the proper authority, however, you can still obtain replacements.

THE SMITH & WINCHESTER
MANUFACTURING COMPANY
Plant and Offices at South Windham, Connecticut

SCREENS
of Perforated Metal

The Harrington & King PERFORATING Co.

1652 Fillmore St., Chicago, 44, Ill. 114 Liberty St., New York, 6, N. Y.

Producers of

SULPHUR

Large stocks carried at all times, permitting prompt shipments . . . Uniformly high purity of 99½% or better . . . Free of arsenic, selenium and tellurium.

TEXAS GULF SULPHUR CO.
Inc.
75 E. 45th Street New York 17, N.Y.
Mine: Newgulf, Texas

Old Rags

White, No. 1—			
Repacked	*3.80	"	—
Miscellaneous	*3.20	"	—
White, No. 2—			
Repacked	*2.90	"	—
Miscellaneous	*2.65	"	—
Third and Blues—			
Repacked	*2.20	"	—
Miscellaneous	*1.80	"	—
Roofing Rags—			
No. 1	*1.55	"	—
No. 2	*1.45	"	—
No. 3 (bagging)	*1.35	"	—
No. 4	*1.35	"	—
No. 5A	*1.35	"	—
Old Manila Rope	5.75	"	—

OPA Maximum Prices.

Foreign Rags

All Prices nominal

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxfords	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—
No. 4 White Linens	2.25	"	3.25
No. 1 White Cotton	4.25	"	4.75
No. 2 White Cotton	3.25	"	3.75
No. 3 White Cotton	2.50	"	3.00
No. 4 White Cotton	1.90	"	2.20
Extra Light Prints	2.00	"	2.40
Ord. Light Prints	1.75	"	2.15
Med. Light Prints	1.55	"	1.95
Dutch Blue Cottons	2.25	"	2.50
French Blue Linens	3.00	"	—
Checks and Blues	2.00	"	—
Linsey Garments	1.90	"	2.00
Dark Cottons	1.50	"	1.60
Old Shopperies	1.30	"	1.45
New Shopperies	1.45	"	1.50
French Blues	2.25	"	2.50

BAGGING

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	4.25	@	4.35
Wool Tares, light	4.25	"	4.50
Wool Tares heavy	4.50	"	5.00
Bright Bagging	4.50	"	4.85
Manila Rope—			
Foreign	—	"	—
Domestic	*5.75	"	—
Jute Threads	5.50	"	—
No. 1 Sisal Strings	*4.00	"	—
Mixed Strings	2.00	"	—

* OPA Maximum Price.

Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	@	—
No. 1 Hard White Envelope Cuts	3.12½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, one cut	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Mixed Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
Mixed Groundwood Colored Shavings	.90	"	—
Overissue Magazines	1.67½	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
Mixed Books	.85	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Mixed Ledger, colored	1.87½	"	—
New Manila Envelope Cuttings, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
Extra Manilas	1.85	"	—
Mixed Kraft, Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
Triple Sorted, No. 1 Brown Soft Kraft	2.50	"	—
New 100% Kraft Corrugated Cuttings	2.25	"	—
No. 1 Assorted Old Kraft	1.75	"	—
New Jute Corrugated Cuttings	.90	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.15	"	—
Box Board Cuttings	.72½	"	—
White Blank News	1.65	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
Old Corrugated Containers	.82½	"	—
Mill Wrappers	.85	"	—

Twines

All Prices Nominal

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.21	@	—
White Hemp	.21	"	—
Fine Polished—			
Fine India	.26	"	—
Unpolished—			
Box	17½	"	—
Paper Makers	.17	"	—
Tube Rope	.19	"	—
Wall Paper	.20½	"	—
Wrapping	.23	"	—
Soft Fiber Rope	.19	"	—
Cotton	.25	"	—

(Hard Fiber)

Medium Java	.18	"	—
Mex. Sisal	.16	"	—
Manila		"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White No. 1	.07½	@	.07½
New White No. 2	.04½	"	.05
Light Silesias	.04½	"	.04¾
Silesias, No. 1	.04	"	.04¼
Black Silesias, soft	.03¾	"	.04
New Unbleached	.07½	"	.07½
Washable Prints	.03¾	"	.03½
Washable No. 1	.02	"	.02¼
Blue Overall	.04½	"	.05½
Cottons—According to grades—			
Washable shredding	—	"	.01¾
Fancy Percales	.03¾	"	.03½
New Black Soft	.02¾	"	.03
New Dark Seconds	1.75	"	2.00
Khaki Cuttings—			
No. 1 O. D.	.03	"	.03¼
No. 2 Mixed	.02¼	"	.02½
Corduroy	.01¾	"	.02¼
New Canvas	.04¾	"	.05¼
New Black Mixed	—	"	.02½

Domestic Rags (Old)

White No. 1—Repacked	3.80	"	—
White No. 2—Repacked	2.90	"	—
Miscellaneous No. 1	3.20	"	—
Miscellaneous No. 2	2.65	"	—
Thirds and Blues—			
Miscellaneous	1.80	"	—
Repacked	2.20	"	—
Black Stockings— (Export)	Nominal		
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	1.55	"	—
Domestic No. 2	1.45	"	—
Roofing Bagging	1.35	"	—
Old Manila Rope	5.75	"	—

Bagging

(F. o. b. Phila.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.00	"	3.50
Sisal Rope	3.75	"	—
Mixed	1.00	"	1.50
Scrap—			
No. 1	3.25	"	3.50
No. 2	1.75	"	1.80
Wool Tares	4.00	"	4.25
No. 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b. Phila)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
Soft White Shavings, one cut	2.50	"	—
White Blank News	1.65	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Overissue News	.85	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.15	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	2.50	@	2.75
Sisal Rope No. 1	*4.75	"	—
Sisal Rope No. 2	*4.25	"	—
Mixed Rope	1.35	"	1.50
Transmission Rope—			
Foreign	(nominal)		
Domestic	2.75	"	3.00
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	5.25	"	—
Jute Carpet Threads	3.00	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	3.25	"	3.50
Wool Tares—			
Foreign	(nominal)		
Domestic	4.25	"	—
Aust. Wool Pouches	3.75	"	4.00
New Burlap Cuttings	4.75	"	5.00
Heavy Baling Bagging	4.00	"	4.25
Paper Mill Bagging	2.50	"	3.00
No. 2 Bagging	1.35	"	— *

* OPA Maximum Price.

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.04½	@	.04¾
Fancy Percales	.04¼	"	.05
New White No 1.	.06¾	"	.07
New Light Flannelettes	.05½	"	.06
Canton Flannels, Bleached	.06	"	.06½
Underwear Cutters, Bleached	.06¾	"	.06¾
Underwear Cutters, Unbleached	.05¼	"	.06
Silesias No. 1	.06	"	.06¼
New Black Silesias	.03	"	.03½
Red Cotton Cuttings	.03½	"	.04
Soft Unbleached	.06½	"	.06¾
Blue Cheviots	.05½	"	.06
Fancy	.02¾	"	—
Washable	.02¾	"	—
Khaki Cuttings	.02¾	"	.03
O. D. Khaki	.03½	"	.03¾
Corduroy	.03¼	"	.03½
New Canvas	.06¼	"	.06¾
B. V. D. Cuttings	.06¾	"	.06¾

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80	@	— *
Miscellaneous	3.20	"	— *
White No. 2—			
Miscellaneous	2.65	"	— *
Twos and Blues, Repacked	2.20	"	— *
Old Blue Overalls	2.25	"	2.50
Thirds and Blues, Repacked	2.20	"	— *
Miscellaneous	1.80	"	— *
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	1.55	"	— *
No. 2	1.45	"	— *
No. 3	1.35	"	— *
No. 4	1.35	"	— *
No. 5, Quality A	1.35	"	— *
Quality B	1.20	"	— *
Quality C	.95	"	— *
* Old Manila Rope	5.75	"	—

* OPA Maximum Prices.

Foreign Rags

(F. o. b Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

BOSTON

Old Papers

(F. o. b. Boston)

OPA Maximum Prices

No. 1 Hard White Shavings, unruled	2.87½	@	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Overissue News	.85	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.15	"	—
Jute Corrugated Cuttings	1.07½	"	—
Misc.	2.15	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Ledger, colored	1.87½	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
Overissue Magazines	1.67½	"	—
New Manila Envelope Cuttings	2.65	"	—
No. 1 Assorted Old Kraft	1.75	"	
No. 1 Mixed Paper	.70	"	—
Box Board Cuttings	.72½	"	—
Kraft Corrugated Cuttings	2.25	"	—
Old Corrugated Containers	1.15	"	—
Overissue News	.85	"	—
No. 1 News	1.00	"	—

CHICAGO

Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices.

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	1.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
No. 1 White Ledger	2.17½	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
White Blank News	1.65	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
No. 1 Assorted Old Kraft	1.75	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
No. 1 Roofing Rags	1.55	"	—
No. 1 Roofing Bags	1.45	"	—